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BULLETIN
OF THE
National Association
OF
WOOL MANUFACTURERS,
FOUNDED NOV. 30, 1864.

JANUARY, 1874, TO DECEMBER, 1875.

EDITED BY JOHN L. HAYES, SECRETARY.



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John H. Hayes of S. Edge.

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National Association of Wool Manufacturers, 162

VOL. V.] BOSTON, JANUARY — MARCH, 1874. [No. I.

THE CODIFICATION OF THE UNITED STATES STATUTES.

As we have few readers and no patrons who are not equally interested with ourselves in preserving our tariff legislation intact, we cannot doubt that they will accept, as a sufficient reason for the delay in the issue of the present number, the circumstance that at the critical period of preparing it for the press the editor was called to Washington, repeatedly, to advise in the preparation of the tariff sections of the new codification of the Statutes of the United States recently under consideration in the House, and now pending in the Senate.

The object of this codification is to place in a methodical arrangement the laws of the United States now extant, omitting the numerous sections in the statute-book not at present in force, and consolidating those which are. This work, as prepared by commissioners appointed for the purpose, was submitted in the rough, although in a printed form, to the House of Representatives. The House appointed a committee from their own number to revise the draft submitted by the commissioners. This committee consisted of learned lawyers; and its high character may be judged by the fact that its chairman was Judge Poland of Vermont, and that such eminent lawyers as Judge Hoar of Massachusetts, Judge Lawrence of Ohio,

and Judge Duell of New York, served upon it. The principal labor, of course, devolved upon the chairman; and the industry, fairness, acumen, and courtesy with which he performed his difficult and delicate duty won the admiration of all who were before the committee.

No part of this work was of so much importance or delicacy as the revision of the tariff sections of the code. The intent was and is to have the code take the place of all other statutes, as the latter are to be repealed upon the adoption of the code. As is well known, the omission or addition of a mere comma, or the most trifling word apparently, may entirely modify the construction of tariff laws; and thus, without any intent on the part of Congress to make new tariff legislation, the code might have the effect of materially modifying the tariff. It is due to the practical sagacity and devotion to the industrial interests of the country which have so eminently characterized Mr. Dawes to state that a communication of his to the editor, and by the latter circulated among the representatives of the leading industrial interests, first called the attention of those interests to the importance of supervising the tariff sections in course of preparation by the committee. The assistance of experts in the various interests thus invoked, which was most heartily welcomed by the committee, was a means of correcting many errors and supplying important deficiencies, and has contributed to make a work which we think will be nearly perfect. The work of the House committee having been so thorough, it was supposed at Washington that the Senate would accept the code as prepared in the House, and its early passage, by the Senate, may be expected. It would be unbecoming in us to speak of the service we may have been able to render, but may be permitted to say that those best qualified to judge believe that the practical work done in this matter, due essentially to the respect accorded to our organization, adds another to the many claims of our institution for support by those interested in preserving the tariff legislation, so far as it defends our industries, intact.

THE WOOL TARIFF AND THE COBDEN CLUB.

It was observed by John Quincy Adams, in his celebrated Report on Manufactures, that "the common defence must be provided for as much against commercial rivalry as against warlike invasion; for the spirit of traffic armed with power, as the experience of mankind has proved, is more insatiable and more grasping than all the Alexanders and Cæsars have inflicted upon the race of man." To this spirit of British traffic is due the organization of an association in England styled the Cobden Club, whose immediate object is the propagandism of the doctrines of free trade, and whose ultimate object is the subjection of all nations to the commercial supremacy of England. That influence on the United States is a primary object of this association is shown by the fact that some sixty of our citizens are enrolled among its honorary members, nearly twice as many as from any other country, and by the prominence given to any American who favors its views.

The "Report of the Proceedings at the Dinner of the Cobden Club," June 28, 1873, now before us, has, for its second title, "Speech of the Hon. David A. Wells, being a Retrospect of the Results of Protection in the United States of America."

As the general economic theories of Mr. Wells are of but little interest to the public since his withdrawal from official position, we do not feel called upon to comment upon any other portion of his speech than that which refers to the woollen interest in this country. Statements of fact which we consider erroneous cannot be passed by in contemptuous silence. Mr. Wells speaks of the woollen interest in this country as follows:—

"Again, the main support of the protective policy of the United States has hitherto been the manufacturing interest; but the manufacturing interest is at last beginning to find out that, in the long run, the indirect losses and burdens incident to protection far more than counterbalance any direct advantages that may have been supposed to accrue from it. One of the most remarkable illustrations of this has been afforded by the experience under the high duties imposed upon the importation of wool and woollens, which range from 50 to 150

per cent *ad valorem*. The main argument made use of by the protectionists in defence of such legislation is, that these high rates of duty were necessary to compensate the American manufacturer for the advantage in wages enjoyed by his foreign competitor.

“Now the results of the census for 1870 show that in the woollen industry of the United States the cost of labor represents, on an average, but from 17 to 20 per cent of the value of the finished product, while other investigations have proved that the maximum advantage at present enjoyed by any European woollen manufacturer over the American on the score of wages is not in excess of 30 per cent. But 30 per cent of 20 per cent is only 6 per cent, and it therefore follows that a tariff of this amount, supplemented by freights over three thousand miles of ocean, commissions, and insurance, ought to be amply sufficient to relieve the American manufacturer of any thing like dread of the influence of the so-called “pauper labor” of Europe. But, as already stated, the existing tariff on the import of woollen goods into the United States ranges from 50 to 150 per cent; and that this is not sufficient to protect the American manufacturer, and give him the monopoly of his own market, is proved by the circumstance that the woollen industry of the United States was never in a more depressed condition, and the proportion of the people who are clad in woollen fabrics of foreign manufacture was never so great as it is at present. The explanation of this singular phenomenon — for a more singular one was never brought to the attention of economists — is, that the doctrine of protection in the United States has been carried to such an extreme, and has so raised the prices of every constituent of manufacturing industry, that protection ceases to protect, and the tariff, in fact, in place of being protective, has become fearfully destructive; so much so, indeed, that by depriving the American woollen manufacturer of the free choice of raw material, it has made it as difficult for him to make good and cheap cloth as it was for the Israelites to make good brick without straw, and, as of old, their cry goes up throughout the land unto the protectionists’ Pharaohs, ‘Why dealest thou thus with thy servants?’”

Mr. Wells says that the main argument for the defence of protective legislation is that the high rates of duty are necessary to compensate the American manufacturer for the advantage of wages enjoyed by his foreign competitor. No one knows better than he that our high rates of local taxation and rates of interest

on capital have always been ranked upon an equality with our disadvantages in high prices of labor. In relation to the inequality existing in the rates of local taxation, Mr. Wells, as Commissioner of the Revenue, makes the following statement:—

“If we select, as an example, the cotton manufacture in Great Britain and the United States respectively, we find that in the former country the incidence of all local or other direct taxation extends only to the rental value of the buildings for the reception of machinery or the promotion of other details of the business; and does not, in any way, regard the value of the machinery which may be placed in such buildings, or the capital employed in its workings.

“On the other hand, in the United States the incidence of local taxation falls on every thing connected with the business of cotton manufacture that is accessible, namely, buildings, land, and machinery, and is, moreover, not unfrequently duplicated in the following manner: thus, factories are often built in this country under acts of incorporation in one State, while the stock is held or owned chiefly in other States. The municipality in which the factory is located taxes the buildings and machinery, and collects the tax of the corporation; the municipality, on the other hand, in which the stockholder resides, taxes the stock to him at its market value as personal property, and leaving the owner no remedy. In one instance (not an exceptional one) brought to the notice of the commissioner, the aggregate of the local taxes imposed on a particular corporation in 1866 amounted to $4\frac{2}{3}$ per cent upon the capital invested, and in 1868 to over 4 per cent.

“But, vicious as this system is upon its face, its effect, especially in a national point of view, cannot be realized until we take into consideration the fact that the capital required in the United States to build a cotton-mill is about double the amount required for a similar purpose in Great Britain. Four per cent, therefore, on the capital of a cotton-mill in the United States represents eight per cent on the same productive power in Great Britain, or a rate which is almost double the average rate of interest in the latter country.”

It will be seen by the last sentence quoted that Mr. Wells is authority for the statement that eight per cent is almost double the average rate of interest in Great Britain. No one need be

told that eight per cent is less than the average rate of interest paid by the woollen manufacturer in this country. Capital, therefore, costs us twice as high as it costs our principal foreign competitor, and we set out with a disadvantage of one hundred per cent. The statement of Mr. Wells that our main disadvantage requiring equalization by duties is the inequality of wages is unfair, and unbecoming one who aspires to speak with the authority of an economic philosopher.

Mr. Wells refers to the census of 1870 as showing that in the woollen industry of the United States the cost of labor represents an average of but 17 to 20 per cent. We do not deny this statement, as to the census results, which Mr. Wells legitimately used; but we doubt the results, as our investigations at a representative mill, where the labor accounts were very carefully kept, show a cost of labor of 21.80; and this does *not* include general labor about mill-yards, nor salaries of agents, book-keepers, superintendents, engineers, &c.*

But we do protest against the application which he makes of these census results. The maximum advantage enjoyed by any European woollen manufacturer over the American on the score of wages, he says, is not in excess of 30 per cent, and as 30 per cent of 20 per cent is only 6 per cent, a tariff of this amount (30 per cent) ought to be sufficient to relieve the American manufacturer. "But," he continues, "the existing tariff on the import of woollen goods into the United States ranges from 50 to 150 per cent." This whole statement is made to give the impression that the labor of the wool manufacturer, which is strictly entitled to a protection of but 6 per cent, and would have ample protection at 30 per cent, has in fact a protection of 50 to 150 per cent. The impression which he would give is palpably erroneous. The so-called duty of 50 to 150 per cent includes the specific duty given to reimburse the duty on wool. That portion of the duty, as Mr. Wells knows, gives the manufacturer no protection at all, and is merely compensatory. The only duty which protects the manufacturer, which is in part neutralized by under valuations, is the *ad valorem* duty.

* Vide Bulletin, vol. ii. p. 544.

This duty on woollens is at present 32.50 per cent, and, considering under valuations, really ranges only from 25 to 30 per cent.

Mr. Wells intimates to his English hearers that the labor of the American woollen manufacture requires merely a protection of six per cent. He never ventured to make such an intimation to American manufacturers. In his official report as special commissioner of the revenue in 1869, he makes this statement :

“ In short, what is now needed to restore prosperity to the woollen industry is a removal of all duties on the importation of foreign wool and dyestuffs, and a general reduction of the duties on manufactured woollen fabrics of every description to twenty-five per cent *ad valorem*. On this basis the most experienced woollen manufacturers of the country assure the commissioner that they can at once extend, diversify, and secure prosperity to their business.”

How can Mr. Wells justify himself for recommending a duty more than quadruple that really required, upon the showing of the Cobden Club speech, to protect the American woollen manufacturer?

Another of Mr. Wells's premises can be corrected by his own statistics. He says that the maximum advantage enjoyed at present by any European woollen manufacturer over the American on the score of wages is not in excess of 30 per cent. One of his own reports as special commissioner gives, as the results of his own investigations, the difference between the wages paid in the United States and the rates which obtain in several other countries, gold being taken as the standard. “ In the wool manufacture the excess over Great Britain is, in woollen mills, 25 per cent ; in carpet and worsted mills, 58 per cent. Over France, Belgium, Prussia, and Austria the average excess is 100 per cent.”* How can these conflicting statements by the same authority be reconciled?

These errors, which we have referred to to show the unfairness which so often characterizes free-trade advocacy, and which might be forgiven in an admitted partisan, but are unpardonable in one who assumes the attitude of an economic philosopher, are

* We quote from Mr. Bigelow, who gives Mr. Wells as authority.

quite immaterial compared with the broad statements as to the results of the existing tariff upon production in our woollen manufactures. Mr. Wells asserts that under the existing tariff, and as he plainly infers, as a consequence of the existing tariff, that of 1867, "the woollen industry of the United States was never in a more depressed condition, and the proportion of the people who are clad in woollen fabrics of foreign manufacture was never so great as at present." A singular argument this to address to a British free-trade club! Could not Mr. Wells see that if his assertions are true, high tariffs are working in perfect harmony with the object of the Cobden Club, namely, the command of the American market? The mission of the club surely must be ended when American protectionists are the most active agents for opening markets to British goods. Another statement is that the tariff, in place of being protective, has become "fearfully destructive; so much so, indeed, that, by depriving the American woollen manufacturer of the free choice of raw material, it has made it as difficult for him to make good and cheap cloth as it was for the Israelites to make good bricks without straw."

There are two propositions contained in these statements which we expect to disprove: viz., 1. That the proportion of imported woollen cloths consumed by the people of the United States has been increased by the tariff of 1867; 2. That in consequence of this tariff the woollen manufacture has had an insufficient supply of raw material.

How the effect stated in the first proposition was brought about Mr. Wells sagely omits to state, except by a vague generalization; and we might apply to him the pertinent words of Mr. Bigelow, in speaking of the condition of the country at the close of the war, when the vast accumulation of army clothing was thrown at almost nominal prices upon our market, and the surplus of foreign manufactures at low prices also helped to weigh down our market: "Will not he show us in what way the reduction of these duties, and the flood of foreign goods which would inevitably have deluged our overstocked market, could have helped the American producer? Until questions

like these are satisfactorily answered by the opponent of the law, his positions and assertions must be regarded as of small account."

In a recent number of our Bulletin,* we published a statement of the imports of woollens for the years 1863 to 1872, compiled by a careful statistician from a report of the United States Bureau of Statistics. In that statement the imports of carpets, worsted dress goods, other woollens, cottons, silks, linens, and all woollens, were arranged under two tables, the first comprising the five years preceding the passage and operation of the tariff of 1867, but including this year, as the effect of the tariff of 1867 was not at first felt, and the other table including five years under the operation of the tariff of 1867. (The tables of other woollens than carpets and worsted dress goods, that is, all woollens known as clothing goods, forming the chief material for the necessary clothing of the people, were as follows : —

1863	18,267,978	1868	1,809,855
1864	24,694,869	1869	13,964,236
1865	12,177,158	1870	14,660,408
1866	33,698,016	1871	20,022,935
1867	21,509,425	1872	25,351,408
	<u>109,746,941</u>		<u>75,808,832</u>

Decrease 31 per cent.

From these official tables it appears that under the first five years of the operation of the tariff of 1867, the imports of the class of woollens constituting the principal material for clothing of the people were *thirty-one* per cent less than during the five years preceding that tariff. The whole amount of imports of these goods during the last period reached only an average of \$15,000,000 foreign value, or say \$34,000,000 home value, while the census for 1870 shows that in the middle year of that period the value of such goods manufactured in the United States was, exclusive of hosiery and knit goods, \$155,405,308. Importations were diminished in consequence of the stimulus

* Vol. iv. p. 346.

which the tariff gave to home production. To these facts we may add another one not shown in the tables, that the value of imported woollens in 1868 was five and a half millions less than in 1860, notwithstanding an increase of population. In spite of these figures, Mr. Wells would have his British allies believe that under a vicious economic system our people are rapidly sinking into a dependence for their necessary clothing upon foreign importations. These figures resolve Mr. Wells's "singular phenomenon" of increased importations by protective duties — "for a more singular one," as he continues, "was never brought to the attention of economists" — into the veriest moonshine.

"Even the small percentage of the consumption of woollen goods which have been imported," as we remarked in former comments on these tables, "we firmly believe were thus imported, not because of their being cheaper than similar goods manufactured in this country, but to satisfy caprice and prejudice too often stimulated by dealers in dry goods and tailors, because, by keeping alive the prejudice of their customers against American manufactures, they can induce them to buy foreign goods at exorbitantly high prices, yielding a much larger profit to themselves than they could realize on the well-known American articles."

We confess that we have been surprised at the astounding evidence furnished by these tables of the efficacy of the existing tariff in the protection of the clothing manufacture. We feared that there might be some grains of truth in the objections made to this tariff by Mr. Wells and his principal ally in this country, the late Mr. Edward Harris. The former in his numerous official reports, and the latter in his pamphlets, have made the crowning sin of the tariff of 1867 to be its destructive effect upon the cloth manufacturers. Mr. Wells, in two official reports, predicts that the duties of the tariff of 1867 "will lead to an importation of foreign woollens into the United States which no tariff short of absolute prohibition will suppress." No objections of this kind were urged against the provisions in the tariff for carpets and dress-goods; for it was invariably maintained by the revenue reformers that the tariff of 1867 was

made by and in the interest of the carpet and dress-goods manufacturerers, while the cloth manufacturers were sacrificed. In view of this charge, other results contained in tables referred to are interesting. They show that the imports of carpets increased, in the five years of the tariff of 1867, 119 per cent, and the imports of worsted dress goods increased 57 per cent. The imports of cotton increased 18 per cent; of silk, 48 per cent; and the aggregate increase of all imports was 45 per cent.

It may be said that Mr. Wells included carpets in his statement of the unprecedented amount of foreign woollen fabrics with which our people are now clad. It is clear to our own mind that he did not have them in mind, since in all of his reports his illustrations of the evil effects of the tariff are drawn solely from its operation on the production of woollen goods, strictly so called. Besides, the point of his speech was that high tariffs diminished the domestic production of the absolute necessities of the people, and we credit him with too much logical acumen to suppose that he would present illustrations having no bearing on that point. Nearly all the carpets for popular use, such as come under the demonstration of necessities, as ingrain and still lower-priced carpets, are of American manufacture; and this manufacture has nearly doubled under the existing tariff. The carpets imported, with exceptions too slight to be taken into consideration, are the high-priced carpets, such as Brussels, tapestries, and moquettes; the domestic mills being insufficient to supply any thing like our whole consumption. Our domestic worsted dress-good manufacture is equally insufficient at present to supply our consumption. Our production in 1870 was \$22,000,331; our importation in the same year was \$15,447,960, representing a home valuation of about thirty millions. In woollens proper for the same year our relation of domestic production to importation was \$155,-405,358 to \$14,660,403, or about \$29,000,000 home valuation. As in carpets, the dress worsted goods principally imported are of kinds not made here; nearly all are properly articles of luxury, being in demand for their styles or fashion. Of the

kinds of dress goods which constitute the bulk of our manufacture, such as delaines, comparatively few are imported. We defy any one to point out how an increase of the tariff could have had any effect in increasing the importation of dress goods and carpets, except the greater capacity to import growing out of the general increase of prosperity under protection.

Assuming that Mr. Wells included carpets and dress goods in his statement that the relative consumption of foreign woollens has been increased by the tariff, the statement is incorrect. Including worsted dress goods and carpets with woollen goods, and calling them all woollens, the tables referred to show that the increase in five years was but *seven* per cent. Now, according to the rates derived from the census of 1870, the increase of population in that period must have been near eleven per cent, the whole gain in ten years having been 22.22 per cent. The increase of importations was, therefore, not nearly equal to the increase of population. And thus, even with the most favorable interpretation, the statement that importations of woollens to this country have increased under the tariff is proved, by statistics which cannot be impeached, to be without foundation.

If we have depression in our woollen manufacture, we must seek for its cause, not in foreign importations, as Mr. Wells alleges, but in home competition, which he ignores, and must never forget that in ten years, while our increase of population was but 22.22 per cent, we increased the manufacture of woollens from *sixty-one millions to one hundred and fifty-five millions.*)

2. According to Mr. Wells, under the present tariff the woollen manufacture has had an insufficient supply of raw material. It was undoubtedly comforting to the advocates of the British economic system, writhing under Mr. Ruskin's reproach, "though England is deafened with spinning-wheels, her people have not clothes; though she is black with digging of fuel, they die of cold; and though she has sold her soul for gain, they die of hunger,"—to be told that America finds it as difficult "to make good and cheap cloth as it was for the Israelites to make good

bricks without straw." What pictures of rags and nakedness in unhappy America must have risen to their vision! And how much they must have been consoled that under our present system British ships would in time bear cloth to clothe our nakedness as freely as American ships bore corn to feed the starving Irish!

Although it may seem unnecessary for us to attempt to seriously controvert the statement of the insufficiency of raw material to run our mills, in view of the figures already given showing our extraordinary production, which to common minds would seem difficult without raw material, the errors of this statement demand a more detailed exposure.

The statement implies either one or both of two things; viz., that our woollen goods have deteriorated or become dearer under the present tariff, or that they are both dearer and poorer. In regard to increase of cost, we do not hesitate to make the broad assertion that at no previous period has the price of clothing relatively to the price of labor been so low as at present. The absolute prices of many fabrics, especially those that form the best tests of the reduction of price, such as flannels, have diminished from 15 to 20 per cent since 1860. In the West, especially where mills have sprung up alongside of the sheep farms, cloths have been cheapened to the farmer, while the prices of wool have increased. Says Mr. Norton, of Illinois, "You cannot find an equal number of farmers who receive so much substantial woollen cloth at so nearly the actual value of their wool as the farmers of the North-west." Says Mr. Stilson, of Wisconsin, in 1872, "The people of the North-west are clothed with garments far stronger and more durable, at less cost, than they ever were under free trade."

That our woollen fabrics have deteriorated under the existing tariff is contradicted by the universal testimony of the large dealers in dry goods. How can the alleged deterioration of our manufactures be reconciled with the fact that of flannels, the fabric of most general consumption, scarcely any are imported; that the beavers and heavy coatings are principally of American production; that blankets made in Minnesota are

exported to England to supply the new lines of sleeping-cars ; that each year brings out some new fabric not attempted before, such as the worsted coatings, and so excellent that they are sold as foreign goods ; that the great clothing-houses purchase about seven-eighths of their material from American manufacturers ; and that the most intelligent of the clothing manufacturers testify the improvements which are being made in our cloth manufacture, and sympathize with the policy which defends our own production of cloth ; or with the most conclusive of all facts, that American production so satisfies the wants of our people that the importation of foreign cloths is constantly declining ?

Mr. Wells would have his British hearers believe that our tariff will not permit the importation of foreign wools. It checks importation of course, as was intended ; but he omits to notice that in consequence of the specific neutralizing duty the American manufacturer is enabled to import such wools as are not grown here or not abundantly ; and our tariff is so constructed as to reconcile the apparently inconsistent objects of protecting the American wool-grower, and giving much freedom of importation of wool to the manufacturer. Theorists of Mr. Wells's school say that the manufacturer *cannot* import. But statistics show that they *do* import, and that at no former period has the manufacturer availed himself so fully of the power to import, the importations of wool in 1872 having been \$27,438,231, the largest on record.

The existing tariff, instead of diminishing the supply of wool, as Mr. Wells asserts, has preserved the most important source of supply ; viz., our own domestic production. Mr. Dodge, our most reliable agricultural statistician, says, " No man in his senses and with ordinary intelligence can fail to see that the tariff of 1867 has been the salvation of our sheep husbandry." The most truly representative body of wool manufacturers and wool growers ever assembled in this country, the Syracuse convention of 1871, say in their address : —

" The high wool duties of 1867 enclosed this country, as it were, in a grand corral, in which our priceless flocks and invaluable races

were preserved for future increase from depredations no less fatal than those of the beasts of prey from which the nomadic shepherd shelters his flocks. The temporarily increased price of new material to the manufacturer, and of clothing to the general consumer, are sacrifices of but little moment for the preservation of our truly national inheritance, a well-established sheep husbandry."

They state the national considerations involved in the encouragement of our domestic sheep husbandry, which cannot be too often enforced.

"There is ample reason for affirming that the duties on competing wools prevailing during the last four years have saved the sheep husbandry of the United States from annihilation. This fact, if true, has broader relations than those bearing upon the immediate interests of wool growers or manufacturers. It is no exaggeration to pronounce the culture of sheep as the most indispensable of national industries. Every government of Europe has acknowledged it to be so by the special care with which each has nurtured its culture. The President of the French Republic, in declaring that "the agriculture of France cannot dispense with sheep," uttered a sentiment applicable to every nation which aims for the utmost development of its internal resources. For clothing armies the chief product of this culture is a muniment of war, as essential as iron is for arming soldiers. It is indispensable as a precursor of general husbandry in new territories, as it is the most important agent of improving agriculture in older States. It is the surest means of bringing up the supply of animal food, otherwise diminishing or stationary, to the wants of an increasing population; and even its waste products furnish raw material for other than textile industries. Sheep husbandry thus is scarcely of less importance in its relations to the general prosperity of a country than as an adjunct to the textile manufacture. But American sheep husbandry is not merely an adjunct of the home woollen manufacture: it is its very foundation. Nearly three-quarters of all the wool consumed in our mills is of home growth. Our fabrics are designed with reference to the peculiar qualities of our own fibre, and derive from them their soundness and durability. Our machinery is adapted for working our own wools, and our best skill, founded on experience of these characters, is exercised in manipulating them. Although we may import limited supplies of foreign wool, the ample domestic supply regulates the cost of such raw material as we may import. The failure of a domestic supply of wool would be as fatal to our mills as the

drying-up of the streams of water which move them. As a result of the economic law that no nation does or can continue to import more than one-tenth of all it consumes, we could not import and pay for all the raw material which our machinery is capable of working up. Neither could American consumers afford to import and pay for their present abundant supply of cheap and good clothing. The decline of the national sheep husbandry involves not only the arresting of immigration to new territory, the continued impoverishment of old lands, the diminution of healthful food, the stopping of mills, and the dispersion of laborers, but it involves the abandonment or curtailment of the vast clothing establishments in our great cities, which are dependent upon American fabrics, and a less abundant provision of comfortable clothing for the great mass of our people.

"These considerations must be kept in view to appreciate the magnitude of the fact that the sheep husbandry of the country has been sustained by protection under such conditions of things as must otherwise have inevitably effected its annihilation."

The tariff of 1867 had not a merely negative influence in arresting destruction in the older States; it had a positive influence, whose fruits are constantly increasing. It developed the now rapidly growing combing or long-wool industry, which had hardly an existence ten years ago. It developed the wool-growing in the Pacific States, which has attained nearly thirty million pounds. It started wool production in Colorado and New Mexico, where the native Mexican stock is being rapidly ameliorated by infusion of Merino blood. It is even now encouraging the hopeful feeling everywhere prevailing at present in the wool-growing States. Dr. Randall informs us that there is a greater demand in Texas than he can supply for his Merino bucks. Mr. Garland, the accomplished editor of the sheep department of the "National Stock Journal," says, in his last issue, that "the demand for good sheep is everywhere very active," and that "the demands for really choice animals is fully equal to the production, and at remunerative prices." These facts, we trust, will convince our readers that a true view of the results of protection in the United States, as illustrated by the operation of the wool and woollen tariff, leads to conclusions widely different from those announced at the Cobden Club.

CARPET-WEAVING AND THE LOWELL MANUFACTURING COMPANY.

By SAMUEL FAY, Esq.

[From "*Contributions of the Old Residents' Historical Association*," Lowell, 1873.]

CARPETS are now used in the United States to a greater extent than in any other country; but they were seldom seen here before the Revolution, and for many years after their use was confined mainly to the cities and larger towns. Some families of the more wealthy farmers indulged a taste for display by covering the floor of the parlor with a carpet which, in its coloring and manufacture, represented the industry and skill of the ladies of the house. A few, and only a few, were possessors of imported carpets. House floors were then in this country, as now in some localities in England, more generally made attractive in appearance by the use of white sand applied after a faithful cleaning of the floor, which, by aid of broom or brush in the hands of the skilful lady of the house, was made to exhibit scrolls and figures in which she displayed a degree of pride that would now ill become the possessor of the most elegant and costly carpet. It had not then been learned that scouring and ornamenting floors, by the use of sand, required time and strength that could better be devoted to other purposes, and that true economy pointed to a general use of carpets.

As early as 1791 a carpet manufactory was established in Philaldephia, — an enterprise which attracted such attention as to induce Mr. Secretary Hamilton, in his report on manufactures made in that year, to recommend an additional duty on imported carpets as an encouragement to home industry.

In the year 1800, a Frenchman named Jacquard invented a machine which has since been known by the name of the inventor. This machine was first attached to looms for weaving silks and muslins, and was found of great value in the fabrication of figured goods, though imperfect in construction as compared with the machine now known by that name.

A Mr. Morton, an ingenious Scotchman, soon after applied it to a carpet loom, and with its aid was able to produce figures

with such a degree of perfection and ease as to soon bring the invention into general use in his country.

In the course of a few years, there were several small establishments started in the United States for the manufacture of carpets. One of them was located at Medway, in this State, and was at first owned by a Mr. Henry Burdett and the late Mr. Alexander Wright, who was the manager of the same.

In 1825 Mr. Wright attempted to gain information concerning the processes of manufacture, by visiting a small establishment then located in Philadelphia; but failing to gain admittance, or to learn any thing of the mysteries of the art, he afterwards went to Scotland, where he purchased looms with which he returned to this country in 1826, accompanied by Glaude and William Wilson, who were employed by him to aid in operating the machinery. Narrowly escaping shipwreck as they approached the shores of New England, Mr. Wright soon had the satisfaction of seeing his looms at work in Medway, with reasonable success. It was soon found, however, that the location of the works was not favorable for extension, and the amount of business that could be done there not sufficient to offer inducements to remain in ownership; so Mr. Wright sold his interest to Mr. Burdett, who very soon after made sale of the property to Mr. Frederick Cabot and the late Mr. Patrick T. Jackson.

At about this time, and while the manufacture of carpets in this country was quite in its infancy, a charter was granted by the Legislature of Massachusetts, under which the Lowell Manufacturing Company was organized.

The meeting of the proprietors for organization was held at the house of Mr. P. T. Jackson, Winter Street, Boston, the 22d of February, 1828, at six o'clock, P.M. At this meeting articles of agreement were signed, and officers chosen.

It is a noticeable fact, that the meetings of the directors, which were frequent, were for a time held at seven o'clock, P.M., — an hour that would now be regarded as extremely inconvenient, or at any rate unusual, and, if customary, might lead to legislative interference.

The first of March, 1828, an arrangement was made with the firm of Whitney, Cabot, & Co. to superintend the affairs of the company, erect buildings, purchase machinery, employ persons to carry on the same when finished, and make all sales of the company. Messrs. Cabot and Jackson sold the mill and machinery at Medway to the new company.

Buildings were erected in Lowell as expeditiously as practicable, and provision made for the manufacture of carpets and cotton goods. The carpet machinery in the mean time was kept in operation at Medway, under the superintendence of Mr. Wright.

The Hon. Peter Lawson, now and for so long a time known as a resident of Lowell, was in charge of the designing department at Medway, and continued that relation to the company for many years after the business of manufacturing was established in Lowell.

The records of the company furnish abundant proof that the manufacture of carpets was regarded as an experiment for some years after being started in this city, and doubts were raised whether the demand would continue to justify paying for the requisite skill. The looms were of the most approved construction then known, operated by hand, and much less perfect than the hand-loom used at a later day.

Mr. Glaude Wilson, who has been mentioned as having come to this country with Mr. Wright in 1826, and who was so long known as a resident in Lowell, was an able mechanic, and made important improvements in the Jacquard machine, — simplifying the construction and making it more reliable in its operation.

The use of hand-loom by the company was continued until 1846; only a few, however, were worked after the introduction of the power-loom. Fifty of the latter were completed and put to work in 1843 and 1844.

Mr. E. B. Bigelow, who was previously known as the inventor of important improvements in machinery, and had established a reputation as a man of great ability, turned his attention to carpet-weaving in 1839; and, feeling confident of his ability to succeed, applied in vain to several parties engaged in the manu-

facture of carpets, for the pecuniary aid necessary for the costly trials of weaving ingrain carpets by power-looms. It was a great undertaking; and no one sufficiently appreciated the advantages that would follow success, until the matter was brought to the notice of Mr. George W. Lyman, then the treasurer of the Lowell Company, whose keen foresight and shrewd business capacity had from the first been devoted, in a measure, to the interests of the company. He having given it his attention, aided by the suggestions and advice of Mr. Wright, made the bold move which led to the abandonment of the use of hand-looms, with their attendant Monday morning and Fourth of July headaches.

Many of the members of this association will remember that the attempt of Mr. Bigelow to produce a power-loom for weaving carpets was regarded as visionary; and none were more confident that he would fail in his efforts than the most intelligent persons then employed in weaving, and who best understood the nature of obstacles to be overcome. For a time prejudice did its perfect work, and freely suggested doubts as to the quality of the fabric produced by the power-loom, it not then being as well understood as now that where the use of power machinery is practicable a more uniform and desirable result is attained than is possible with machinery that is worked by hand.

Mr. Bigelow has gained an enviable reputation — not confined to this country — by his inventions for cheapening the cost of production, and improving the quality of the leading varieties of carpets. His inventions have completely revolutionized the weaving department, and in some degree worked important changes in other machinery.

Had Mr. Lyman been advised by one less practical in his ideas of mechanics, or less zealous in introducing improvements, than Mr. Wright, a high degree of perfection in the art of carpet-weaving would doubtless have been long delayed, and the Lowell Company would have aided in originating one less of the greatest mechanical developments of the age.

Persons who knew Mr. Wright socially, and were reckoned among his most intimate friends, but who had no business

relations with him, could have entertained no just conception of the mental strain occasioned him by the change in the organization of mills and machinery that necessarily followed the introduction of Mr. Bigelow's improvements. The leading ideas, in remodelling the works, originated with Mr. Bigelow ; but much in the detail in practical adaptations were worked out by Mr. Wright, and the strain upon the nervous system was such as to cause it to prematurely yield.

While he was superintendent, the Lowell Company, from a small beginning, took its position as one of the important manufacturing establishments of this city, and in its appointments and mechanical arrangements was second to no ingrain carpet manufactory in the world. Its machinery, in the main, represented skill developed in the course of its regular business, or such as was brought to its aid by special appropriations of its money. The circumstances have been such from the start as have made it necessary for this company to rely mainly upon its own efforts for progress in perfecting machinery specially adapted to its use. Not unfrequently large sums of money have been expended in experimental tests, some of which, as might be expected, resulted in failure, while success has followed others, and secured great advantages to the company. Had carpet establishments been as numerous and extensive as those engaged in other branches of manufacture, the expenses attending advancement in its mechanical arrangements would doubtless have been shared with others, and its works would then have in a greater degree represented skill of those elsewhere employed.

Mr. Wright was so long known as a prominent citizen of Lowell, it is proper that allusion should be made to circumstances in his history having no connection with this company. He was born in Renfrewshire, Scotland, in the year 1800 ; first attended school in Paisley, afterwards at a place near Glasgow, where he was represented as the most prominent scholar, and always at the head of his class. When fifteen years of age he came to this country, his father having come over some years earlier, and was employed as a bleacher at Smithfield, R. I.

Young Wright worked with his father in that place and at

Waltham, in this State, until twenty-one years of age, when he commenced the manufacture of coach lace on his own account, which he continued until his attention was directed to the manufacture of carpets. Soon after the removal of the carpet machinery from Medway to Lowell, he became a resident here. On the 7th of June, 1852, he was suddenly removed by death; and his remains now rest at Mount Auburn.

Mr. Wright was eminently social and intelligent, — was ever deeply interested in new developments in the arts and sciences, — was public-spirited, but without the prominence of many less gifted persons, who possessed an ability which he was accustomed to say he lacked, viz., “the ability to express his thoughts when on his feet.” Naturally modest and retiring, it was to him less the occasion of regret that he could not speak in public than a misfortune to our city that one so intelligent should be unable to express his views publicly when occasion required. He never desired office, but in 1835 was chosen representative to our Legislature; an alderman in 1836; a member of the school committee some years later; and was often urged to allow his name used as a candidate for the office of mayor, which he as often positively declined. His name is worthy of record, as one to whom our city is much indebted for early efforts in behalf of her educational and industrial interests.

From the date of the organization of the Lowell Company to that of his decease, he superintended the carpet department of the company, and, with the exception of a short period of time in which Mr. David Moody was employed, had charge of the cotton-manufacturing department also, covering a period of twenty-four years.

The writer of this paper succeeded Mr. Wright as superintendent, and in his management has endeavored to maintain the high position of the company, keeping pace as nearly as possible with the improvements in other branches of manufacture, that have appeared in the twenty years and more that he has occupied the position. He has also added machinery, thereby very materially increasing the productive capacity of the mills.

This company has, from the earliest day of its existence,

been favored with the services of very able men as directors, some of whom have held office for many years. One (Mr. George W. Lyman) served the company as treasurer or director from the day of its organization until January, 1872, when, because of age and infirmity, he positively declined a re-election.

It has also been equally fortunate in its selection of treasurers, one of whom it is proper to mention here particularly, because of his having been for a short time a resident of Lowell. I refer to the late Mr. Israel Whitney, who was the agent of the Tremont Mills at the time they were started and until they were in successful operation. He was first chosen treasurer of the Lowell Company in January, 1848, and continued in office until January, 1863, when he declined a re-election. From that date to the day of his decease, Nov. 12, 1871, he was one of the board of directors. He was deeply interested in the affairs of our city, and entertained a special regard for many of its citizens, with whom he became acquainted at the time he resided here and in later years. Some of the members of this association knew him personally, and will ever cherish a pleasing recollection of him as genial and strong in his personal attachments, with marked ability in transacting business, and ever entertaining a sense of mercantile honor that allowed no departure from the course of strict integrity. The value of his services to the Lowell Company cannot well be over-estimated. Commencing with it in the darkest days of its history, he imparted to it a life and vigor that surmounted all difficulties; and years before his decease he had the satisfaction of seeing that his efforts had been crowned with a good degree of success.

This company having commenced business with a branch of manufacture as its leading object about which but little was then known, — with a prospect of only a limited demand for its products, and in a comparatively early period in its history subjected to the losses and risks attending a radical change in machinery, — it may well be thought remarkable that it should have at no time failed to promptly meet all just claims. It has had occasion to struggle in overcoming obstacles not within its control, and there have been times when its stock has been

looked upon with distrust ; but if less fortunate than some parties engaged in other branches of manufacture, the average results of its history of forty-four years to January, 1872, may be regarded with a measure of satisfaction.

It commenced business with a capital of \$300,000, adding to it from time to time, as occasion required, until it reached \$2,000,000, — a sum which has represented its capital for more than twenty years. The average of its capital for the forty-four years of its existence is \$1,278,400 ; and its dividends have amounted in all to the sum of \$5,467,000, — an annual average of \$124,250, or 9.72 per cent. It should be noticed that, in averaging dividends, the time is included in which the works were originally constructed, and also the longer and more embarrassing time during which the change was made that became necessary in adopting the use of the power-loom, and the great increase of machinery that soon followed.

The business of the company has required more than ordinary mechanical ability, — a demand which has been met by a long list of worthy names. In late years, many of these men have been known elsewhere as prominent and successful mechanics and manufacturers. Some are now in our city and in various parts of the country, respected as citizens, as men of business, to whom important official trusts are confided, and whose pecuniary circumstances are such as only intelligence and industry could have secured.

The future of the company cannot be predicted with safety ; but it is now presumed to have elements of success far in advance of any previous date.

MR. HARRIS-GASTRELL'S REPORT UPON UNITED STATES TEXTILE INDUSTRIES.

It is an admirable feature of the diplomatic service of Great Britain that Her Majesty's secretaries of embassy and legation are required to furnish special reports of the industries of the

several countries in which they serve. This feature, so indicative of the interest which Great Britain has always shown in developing her own industries, might well be imitated in our own diplomatic service, if our service offered any career which would justify the requisite preparation, or promise any reward for faithful work of this kind. We have before us, in a volume of 819 pages, the "Reports of Her Majesty's Secretaries of Embassy and Legation respecting Factories for the Spinning and Weaving of Textile Fabrics," presented to Parliament in 1873. Over five hundred pages of these reports have been contributed by one of the secretaries of legation in Washington, Mr. J. P. Harris-Gastrell, to whose courtesy we owe the volume before us.*

An intimate personal acquaintance with Mr. Harris-Gastrell, and many hours of conversation upon industrial and economic questions, had prepared us to expect in his work the evidence of something more than a routine discharge of official duty. We acknowledge that this expectation was not diminished by the fact that all the material of our own preparation and collection, and all at our command, had been placed most heartily in his hands, while our introductions facilitated his obtaining information from some of our most eminent manufacturers. The possession of landed estates in the vicinity of extensive manufacturing establishments early directed the author's attention to industrial questions, and gave him unusual powers of technical observation and appreciation. After a long diplomatic service in Europe and South America, he comes to this country in the full maturity and vigor of manhood, with an appreciation of our institutions rarely found in a foreigner. We are safe in saying that no one has ever studied our industries more faithfully, or described them with so little prejudice. As an illustration of his fairness, we observe that he has given the views, on each side, of the highest authorities on protection and free trade, and so fairly that it is difficult to discover his own bias. In speaking of our system of protection, he adopts a language which could only be used by one who thoroughly comprehends its motive, so little understood

* We learn with regret that Mr. Harris-Gastrell is upon the point of leaving this country for his residence at Stanley Hall, Wakefield, Yorkshire county, England.

even here at home. The advocates of protection are styled national defence economists ; and Mr. Bigelow is spoken of as a high authority on manufacturing and economic questions from the stand-point of "national defence."

Without venturing to assert that Mr. Harris-Gastrell favors our school of national economy, we believe that few have more thoroughly read our works. The works of Mr. Carey were first read by our author in German at Vienna, and his respect for our great economist he evinced in the following passage : —

"I have not quoted from the great works of Henry C. Carey, from which so many writers of the same school of economists have drawn so many an inspiration, because I have taken it for granted that, since the Carey definition of 'labor value' has been adopted in the form of the 'service value' of Bastiat, and since his views as to the original cultivation of land have prevailed, his works, and the opinions therein expressed, are sufficiently known on the other side of the Atlantic, as manifesting the economic policy which is at present guiding the United States in her industrial development and international commerce."

We do not desire to do Mr. Harris-Gastrell the injustice of being judged by disjointed extracts ; but for the benefit of the reader who may desire to know in the shortest possible terms what, upon the whole, this intelligent observer thinks of us as an industrial nation, we quote the concluding paragraphs of his report : —

"I cannot close this report without recording the fact that, in every important branch of industry referred to in the course of the previous pages, the American manufacturers seem to be ever gaining on their competitors of the Old World, by availing themselves to the utmost of every advantage of improved process or labor-saving machinery which American or other invention may offer.

"There can be little doubt that the celerity with which all such advantages are thought out, and then introduced into general use, is owing to the constant pressure of high rates of wages, and the comparatively certain protection of capital invested in inventions.

"Neither can I close it without observing how favorably the great industries of the United States would probably compare with the best

organized of the competing industries of Europe. The past history and present development of the textile industries is an earnest of a prolific future. Whether or not a reduced cost of living shall ever be attained, one cannot doubt that, under sound conditions of production, American industry will not only supply its home market in most articles, but will also become a formidable competitor in foreign markets in many articles.

"How soon that competition abroad may take place in this or that industry, is not for me to conjecture. But I think that the data in this report are sufficiently full and correct to enable others to predict that time in respect of the cotton and woollen industries."

We shall not, at present at least, republish the very interesting and excellent report upon the wool and worsted manufacture in the United States, because this report is so largely made up from material printed in our "Bulletin" and other publications, not less than sixty pages of the report being drawn from this source. The writer has used this material with proper acknowledgments, and with much skill and judgment. We have no little gratification that our publications have thus assisted in placing the situation of our industry in a creditable form before the most intelligent readers of England.

We select for our pages portions of the report on the manufacture of cotton.

EXTRACTS FROM REPORT UPON THE COTTON, WOOLLEN, AND OTHER TEXTILE INDUSTRIES OF THE UNITED STATES.*

3. *General Features of Textile Industry.*

9. In the United States the wool industry seems to have rather succeeded the cotton industry than have preceded it, as is the usual sequence of those industries in the Old World. Both cotton and wool are now of great importance, and the silk industry has made rapid progress. But the real linen industry has obtained no ground of vantage, although a jute industry is springing up.

Cotton
industry
preceded
woollen.

Silk in-
dustry.
Linen and
jute.

* Our space forbids the publication of the entire report; but we have preserved, in the portions which we select, the author's numbering of the sections and paragraphs. This will be some indication of the matter omitted.

Silk mills. There are some silk mills of the best kind, famous for their products. There are likewise many cotton and woollen mills competing in excellence as well as in cheapness. The largest cotton mill has 130,000 spindles and 3,000 looms, and the largest woollen mills have 100 or more sets of machinery. The wool industry, although it has several centres, is more or less distributed throughout the country. But the cotton industry is mainly concentrated in two or three centres, and has only straggled into other parts of the country.

Cotton mills.

Woollen mills.

Their distribution.

Their arrangement. 10. The arrangement of woollen and worsted mills seems to be about the same as in England. But spinning and weaving worsted became so profitable that there are several makeshift establishments of straggling plans. The arrangement of cotton mills varies in the United States probably rather more than in England. The variety is from a mill arranged entirely on a ground floor to the high-storied mills arranged on the best working plan. The usual arrangement in the best of these seems to be, — the blowing-room on the ground or basement floor, and not always in the main building, carding rooms at the top, with spinning, and then weaving rooms in the intermediate stories. But in some there is a kind of alternate plan of spinning, partly on ground and third floors, with weaving rooms on the first and second floors; and in some others, of a straggling construction, there is a straggling arrangement.

Their construction. In construction, the mills are not usually what are in England called fire-proof buildings; neither are they, perhaps, as strongly built as in England. But the best are certainly fine buildings, erected to last for a long time. Iron girders, with stone floors, are generally at present beyond the reach of the American mill-owner. The mill has usually very heavy beams or girders, three to four inch thickness of deal planking, with a southern hard pine floor on the top of the planks.

Special advantages. 11. Certain manufacturing localities, such as Lowell, Lawrence, and others, have great advantages in water-power. But in New England the most rising town is Fall River, where steam-power is more effective than the water-power of its fall. It is adding fourteen large mills in this current year to its former number of about 1,000,000 spindles. The object in selecting a site is to build as near as possible to tide-water; yet several mills, as soon as the fall was occupied throughout its length, were built on the hill around the lake, and have now the disadvantage of extra hauling. There is an idea of lessening the cost of this by putting down rails from the water-side to

these mills, and using a hauling machine. The reason of this lesser efficiency of the older mills on the Fall River itself is the narrow construction and the older machinery, and sometimes the smaller size. Fall River, as a whole, saves freight in and out, procures its coals from Philadelphia, and sends its goods to New York more cheaply than any other place in New England, except Providence and its neighboring towns. The Middle States have the advantage of being nearer the coal regions than New England.

There is not in the United States the same specialization as in England. Spinning, weaving, and even machine-making are carried on in the same establishment, and printing is accompanied sometimes by all three. All the profits are received by the proprietors; but it is open to doubt whether, in a greater subdivision of the processes of manufacturing, one profit would not be relatively greater. It has, however, been hitherto a necessity that in the United States a manufacturing establishment should be entirely, or almost entirely, self-contained. Little specialization.

The ventilation and lighting of mills are attracting attention. The subject is of much importance in the Northern States, and even of greater importance in the northern parts of New England, where the winter days are short. A gas sunlight has been suggested as the best mode of lighting up the machines, and, at the same time, of securing great ventilation. By alterations in these directions, it is expected that the productiveness of the laborer in the dark hours will be increased. Ventilation and lighting.

12. It is a pleasure to visit an American mill, where the cheerful faces of cleanly operatives greet one's entrance. As a rule they surpass the European operatives in pleasant appearance and respectable clothing, and they mind clean and well-kept machinery. The Pacific Mills obtained an European reputation by winning a medal at the 1867 Paris Exhibition for its excellent care of the operatives. In most mills it is the special pride of the proprietors to provide, as far as possible, for the higher wants of the operatives. But the former glory of Lowell and similar places is departing; for the American farmer's daughter is retiring from the mill, and the European immigrant is taking her place. This change has already occurred in most mills, where the farmer's daughter is only to be exceptionally found in the higher departments of labor. In a few mills, however, running on carpets and high-class work, she can still be seen. The main dependence of mills is, nevertheless, upon the immigrant laborers. This is Looks of operatives.

New kind of hands.

Dependence on immigrants.

a feature which, as regards the inferior class of labor in all industries, is becoming very marked; for the Americans, native-born, whether they be of American descent or of immigrant grandparents, too often arrive at maturity of manhood with a laudable but sometimes premature ambition to step up to something higher than manual labor. They accumulate in cities and crowd into other callings, where their labor is often ill requited, whilst the pay of unskilled labor is enhanced.

But it may not always be without danger to a community at large that certain classes of labor can only be supplied by immigration, and are avoided by the native-born laborers. This tends, moreover, to split the community into two unequal parts, and to destroy the democratic equality of manual labor. But in the United States the greatest danger of such a state of affairs is remote, namely, the cessation of immigration. Until the conditions of success in life are more equalized in the old and new worlds, immigrants will continue to cross the Atlantic at the rate of a thousand a day, and the pauper labor will unceasingly move from east to west, and occupy the pauper land, and create a wealth, magical in rapidity, but solid and permanent in value.

PART II.

1. THE COTTON MANUFACTURE IN 1870 ACCORDING TO THE CENSUS.

(a.) *Yarns, Piece Goods, &c.*

13. The census returns for 1870 have been most carefully revised, and in regard to the cotton manufacturers are said by cotton statisticians to be as accurate as statistics on such a complicated and hidden subject can be. And it must be conceded that they are fuller and probably more correct than any statistics in any other country embracing as wide a range of detail. It is also acknowledged that they represent more exactly the true position of the cotton manufacture in 1870 than the corresponding statistics do for the years 1860, 1850, and 1840, respectively. Indeed, the statistics of 1840 and 1850 are rendered useless for purposes of comparison by the many and large errors which have been discovered in them.

Special cotton statistics.

The 1870 returns of the cotton manufacture in full detail are not yet in an accessible shape; but I have been favored by General Walker, Superintendent of Census, with a copy of the special statistics in the aggregate by States of the cotton manufacture in 1870. The following is the table of these special statistics: —

(Table A) — Cotton Goods, 1870, 1880, 1890.

NOTE. — Throughout this Report the currency dollar is taken at an average value of 3s. 3d.; the cent is therefore one-tenth less than a halfpenny, or 0.45d., and the mill is one-tenth of a cent, or about 0.45d. To turn into sterling, multiply the dollars, cents, and mills by 45, and call the dollars pence. But in 1890-70, the period covered by these Returns, the average value of the dollar was really about 4d., or one-eleventh, less. — J. P. H. G.

States and Territories.	Steam-Engines.		Water-Wheels.		Machines.			Hands Employed.			Capital.	Wages.
	Horse-power.	Number.	Horse-power.	Number.	Looms.	Frame Spindles.	Mule Spindles.	All.	Males above 16.	Females above 16.	Youth.	Dollars.
The United States	47,117	448	99,191	1,240	187,310	3,694,477	3,457,938	135,369	42,790	69,637	22,942	Dollars. 38,044,132
1. Alabama	175	3	824	14	632	19,802	8,244	1,032	303	445	284	\$31,000
2. Arkansas	15	1	10	1	125	1,000	1,000	17	8	3	6	13,000
3. Connecticut	860	15	10,840	177	11,943	284,760	302,382	12,068	4,443	4,734	2,909	12,710,700
4. Delaware	500	5	370	6	771	18,634	10,900	726	225	286	215	1,166,300
5. District of Columbia	...	...	...	...	...	...	...	...	...	...	...	...
6. Florida	...	...	...	...	...	...	...	...	...	...	...	...
7. Georgia	290	4	2,920	59	1,887	74,148	11,454	2,946	1,147	1,060	619	3,483,265
8. Illinois	47	3	90	2	16	1,856	...	98	26	31	41	151,000
9. Indiana	1,081	7	80	2	448	17,360	...	503	119	179	206	551,500
10. Iowa	6	1	...	...	...	...	...	6	3	3	...	1,500
11. Kentucky	330	5	60	1	72	7,060	674	269	77	71	121	405,000
12. Louisiana	225	4	...	...	292	10,200	2,884	246	123	57	66	592,000
13. Maine	320	2	8,018	85	9,902	259,394	200,178	9,439	2,006	6,246	587	9,839,685
14. Maryland	1,991	8	1,991	21	1,947	82,212	6,900	2,860	688	1,452	720	2,734,250
15. Massachusetts	17,217	111	32,310	335	55,343	1,255,552	1,363,869	43,512	13,694	24,065	5,763	44,714,375
16. Mississippi	270	3	96	3	162	2,528	1,000	265	88	88	99	751,500
17. Missouri	375	3	...	...	415	16,015	7,000	361	107	154	100	489,200
18. New Hampshire	915	7	17,777	94	19,091	447,795	302,048	12,542	3,752	7,490	1,300	13,332,710
19. New Jersey	1,799	15	1,260	22	2,176	107,542	93,038	3,104	1,096	1,745	683	2,762,000
20. New York	4,896	40	5,202	62	17,218	131,890	361,193	9,144	2,008	4,546	1,990	8,511,336
21. North Carolina	120	3	618	34	618	37,967	1,940	1,483	238	916	279	1,030,900
22. Ohio	305	5	81	3	298	14,320	8,920	462	99	147	99	555,700
23. Pennsylvania	7,440	116	1,963	44	12,862	232,528	201,718	12,790	3,859	6,067	2,774	12,550,720
24. Rhode Island	139	71	10,728	186	18,075	503,797	539,445	16,745	5,893	8,028	3,134	18,836,300
25. South Carolina	...	...	...	...	14	745	257	1,123	289	508	396	1,237,000
26. Tennessee	470	9	676	21	313	22,495	5,438	880	232	463	175	970,050
27. Texas	268	4	...	...	235	8,478	400	291	184	53	55	486,000
28. Utah	...	...	33	3	11	1,020	...	16	10	2	4	42,000
29. Vermont	50	1	600	12	628	16,532	12,236	451	125	242	84	670,000
30. Virginia	210	2	750	19	1,310	76,116	1,000	1,741	921	507	313	1,128,000

2. THE COTTON MANUFACTURE IN DETAIL.

*a. Construction.*Cost of
land.

69. In considering the position of the cotton manufacture in the United States in respect of the construction of mills, the factors of land and building materials may be separately regarded.

The price of land varies considerably, according to position; but as the average agricultural value per acre of land, even in the New England and Middle States, is much below the corresponding value in England, it may be safely considered that usually the cost of the land required for a mill is not a greater factor in the cost of construction than in England, even if it be as great a one. The addition of building value to agricultural value does not usually make the cost of land as high as in England. But when the comparison is carried further, and sites in manufacturing towns are compared, it will often, I think, be found that, value for value, the cost of building land is higher than in England. The reason is, that the economy resulting from the advantage of the good position is relatively greater in the United States, on account of the generally higher cost of labor.

In Providence, which is a wealthy manufacturing and banking town, the prices of sites within the town vary around 5*l.*, run down to 5*s.* at the edges, and, according to distance, pass through 2*s.* to about 1*s.* a square foot. In Fall River, which is purely a cotton-manufacturing town, rapidly increasing in number of inhabitants, sites are as yet, except in the middle of the town, rather cheaper. At Lowell, the well-known manufacturing town of Massachusetts, it would seem possible to obtain land at 5*s.*, and, a mile out, at 2*s.* a foot. But the water-power of Lowell is taken up, and its position does not seem adapted to enable it to compete in mills using steam-power only with such places as Fall River.

The above prices are quoted merely as specimens of building value, and not as indicating the true average cost of building sites for mills.

I am inclined to think that in the cost of construction the cost of land may be taken as being, on an average, about the same as in England.

Cost of
building
materials.

70. In building materials, bricks seem to cost more than in England. The average value of common brick in 1870 at the yard may be deduced from the census returns, as having been about \$9, or

32s. 9d., per thousand. In Pennsylvania it was about \$12, or 45s.; and in Massachusetts about \$10.50, or 31s. 4d. They are mostly machine-made, yet the cost of the labor of manufacturing the materials into bricks may be inferred to have been —

	Per 1,000.		
In the United States	\$3.78	=	12s. 11½d.
Pennsylvania	4.97	18	7½
Massachusetts	4.10	15	4½
New York	3.50	13	1½

These prices have not altered materially since 1870. In November, 1872, common bricks were quoted at New York at \$5 to \$8.50, and were delivered in the dock at Fall River at \$12 per thousand. The higher price and labor in Pennsylvania is mainly caused by the larger proportion of fine bricks in the production. The average price and relative cost of labor in the brick-manufacturing districts may be taken at \$8 and \$4 respectively for the range of common bricks. The average annual cost of labor per hand is about \$250, or 47l. 17s. 6d., as deduced from the census returns. According to Dr. Young's pamphlet on the cost of labor and subsistence in the United States for 1869-70, brick-makers in New York and its vicinity earned \$21 to \$24, or 78s. 9d. to 90s., a week. Their helpers probably earned from \$12 to \$15, and the boys from \$6 to \$9. If at any time these rates should diminish, the material of bricks in the cost of constructing mills will be proportionably less than now. The proportion of wages to product since 1860 has remained about the same, if the corresponding census returns for both years be correct; so that it may be assumed that improvements in machinery and mode of manufacture have counterbalanced the increased cost of labor. Further improvements may, therefore, reduce the price of bricks, if, as is probable, the cost of labor does not increase.

Stone is used for building when it is advantageous to do so; but sometimes, even with stone close at hand, bricks are chosen. The cost of constructing with stone may be taken at about the same rate as constructing with brick, after due allowance for the superiority of stone over brick. Artificial stone, which is often preferable to stone or bricks, has not yet come into use.

Timber for building purposes is an important item. It is an item in cost of construction which seems likely to increase in price from a scarcity or comparative scarcity of the raw material. It appears from a trustworthy circular, which has been sent to "lumber" dealers

Probable
scarcity in
Susque-
hanna re-
gions.

and consumers from Pennsylvania, that three years' "stocking" at the present rate of 500,000,000 feet annually from the Susquehanna and its tributaries would entirely exhaust all the pine lumber at present standing in that large area. As regards the pine lumber of the North-western States (Wisconsin and Michigan), a similar comparative scarcity is likely to occur within a quarter of a century. On the other hand, in some parts of the Eastern States, the farm lands are returning to their primary condition of woodlands. Even now it is known that "lumber" can on the Canadian frontier be cut down, sawed, and then shipped ready for direct use in building and sent down to Washington cheaper than builders can procure the same things nearer the capital.

The following statement contains the prices of sawn lumber at Cincinnati:—

	1870.		1871.	
Dry, from yards—				
Clear pine	\$55.00		\$55.00 to \$60.00	
First common	45 00 to \$50.00		45.50	47.50
Second common	32.50		27.50	28.00
Third common	20.00	22.50	20.00	22.50
Framing	27.50	28.00	22.50	25.00
Poplar	20.00	27.00	18.00	20.00
Shingles, No. 1	8.00	8.50	7.50	8.00
Green, on arrival—				
Oak	18.00	20.00	20.00	22.50
Ash	20.50	25.00	22 00	26.00
Walnut	40.00	45.00	35 00	45.00
Cherry	25.00		25.00	35.00
Poplar	15.00	20.00	18.00	24.00

Prices of
building
materials.

The following price list of building materials at New York in November last contains also the prices of lumber:—

BUILDING MATERIALS.

Bricks—

Common hard	per 1,000	\$5.00 to \$8.50
Crotons	"	12.00 16.00
Philadelphia fronts	"	40.00 45.00

Cement—

Rosendale	per bbl.	1.60
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Lime—

Rockland, common	"	1.85
" lump	"	1.75

Lumber —

Southern pine	38.00	40.00
White pine box boards	31.00	33.00
White pine mercantile box boards	32.00	34.00
Clear pine	69.00	79.00
Spruce boards and planks	30.00	32.00
Hemlock boards and planks	27.00	34.00

Nails —

10d. to 6d., common per keg	6.00	
Clinch, 2 inch to 3 inch and over „	7.50	8.00
Yellow metal, sh. and sl. „	.27	.30
Copper „	.45	

Paints —

Lead, white, American, pure, in oil	.11½	
Lead, white, American dry	.10	
Zinc, white, dry, No. 1	.09	.09½
„ No. 1, in oil	.11½	.12
Paris, white, English per 100 lbs.	2.00	2.50

71. The proportion of wages to product in sawed lumber has, according to the census returns, decreased some 10 per cent since 1860. Wages to
product in
timber. But the cost of the raw material has, according to the same returns, increased some 10 per cent since 1860. The general result seems to be that the improvements in mode of manufacture have counterbalanced the increased cost of labor and the increased cost of raw material.

The prices of cement, lime, nails, and paints, are also given in the New York price list above. In all these prices the cost of labor is a large item, and any reduction in wages from reduced cost of living Reduction
of cost. or other causes would materially affect all the prices.

72. Iron is another important item in cost of construction. Its Iron. price in the pig, averaging the United States, may be inferred from the census returns in 1870 to have been about \$34, or 127s. 6d.; in which the cost of labor, \$6, or 22s. 6d.; the value of ore, \$12, or Price of. 45s.; and the coal, \$9, or 33s. 9d., per ton of pig. In the items of ore and coal the cost of labor largely enters. A general average reduction of 25 per cent in labor throughout the country would probably reduce the cost of pig in the United States by nearly 50s. per ton. But this is not likely to happen. The variation in the price of iron has been very great during the last year, but the cost of production in the United States has not been increased since 1870. In some places it is much lower than the above average for 1870.

The rates of wages at the furnace vary from \$9 for ore breakers, Wages in.

guttermen, &c., through \$11 for fillers to \$20 to \$25 for engineers, and \$30 to \$40 for foremen.

Prices of. The divergence of prices in the United States from prices in England for forged, rolled, and cast iron is relatively greater than that in respect of pig iron, inasmuch as the difference between the corresponding costs of production in each country increase, other things remaining equal, in proportion to the relatively higher cost of labor in the United States, and as labor enters largely into the further manufacture of iron.

In regard to this important item in the construction of mills, I am inclined to think that the price to the consumer of native iron might within a short time be much less than its normal price of the last three years.*

Cost of labor in building. 73. The cost of labor in building is large. In 1870, according to Dr. Young's pamphlet, wages of bricklayers and masons (including helpers) varied from \$3 to \$4 net per hand in the New England States, and ranged rather lower in the Middle States, and averaged about the same in other manufacturing States. In Providence, for instance, the daily wages of a mason and helper are \$4 and \$2 respectively. The daily wages of painters were about \$3 in the New England States, ranged from \$2.50 to \$3 in the Middle States, and averaged about \$3 in the other manufacturing States. The daily wages of carpenters were about the same, and those of plasterers ranged nearly one-third higher. The average daily wages of these four classes of mechanics would in sterling be as follows:—

Statement of Daily Wages without Board.

	Bricklayers and Masons, &c.	Carpenters.	Painters.	Plasterers.
New England States	18s. 1½d.	10s. 5½d.	10s. 9d.	12s. 9d.
Middle States	12 6	8 4½	9 11½	11 10½
Western States	18 9	11 2	11 1	18 3½
Southern States	11 7	11 0½	12 6½	11 9½
General average	12s. 9d.	10 8	10 7	12 5

The carpenters of Brooklyn, N.Y., are at this present date, March 31, threatening to strike for \$3.50 per day of eight hours, as \$3 is entirely insufficient for their proper support.

* October 30. — For further information, see my Report on Iron and Steel Industries.
— J. P. H. G.

74. As the cost of labor for these four classes is about one-third of the value of their productions in a building, and as the cost of labor in general at the building site is about one-third of the total cost of building in the United States, any diminution in the rates of labor would make a large difference in the cost of building a mill. The rates, however, may become a little lower, but are not likely to decrease much until the cost of living is lower than at present. There are certain mechanical improvements which to a certain degree counterbalance the increased cost of labor in these classes since 1860. One of them is the mechanical hod-carrier, which astonished the Irish on strike during the construction of a large mill in the north. It will be remembered that mills in the United States are not usually built to be fire-proof.

Labor to materials.

Reduction of cost.

75. In the United States it is usual to build houses for the hands wherever a mill is built. Moreover, a mill usually means an establishment in which all the processes of spinning and weaving are carried on under the same roof. If only the Eastern and Middle States be taken, the lowest rate of cost of construction of a mill fully fitted up with machinery and ready to produce, of which I have heard, is \$16, or 3*l.*, per spindle. This was a brick mill built a year or two since under favorable circumstances. A mill of 75,000 spindles recently built is said to have cost \$1,250,000, or about \$17, or 63*s.* 9*d.*, per spindle. This seems to have been exclusive of the cost of the necessary village for the hands, which probably added \$3, or 11*s.* 8*d.* to the cost per spindle. As another instance, a mill built of stone, which was quarried close by, with half of the houses required for the hands, cost only \$18, or 67*s.* 6*d.*, per spindle.

Mills with houses.

With both spinning and weaving.
Cost of construction per spindle.

Several mills, exclusive of houses for operatives, seem to have been built and fitted up for \$18, or 67*s.* 6*d.*, per spindle. But the rate of \$20, or 75*s.*, per spindle, probably, but not always, excluding houses for operatives, seems to be more frequently the lowest cost of an economical mill constructed on the best principles. This rate of \$20 seems to be the normal rate, if one may so call it; for in 1840, in Mr. Montgomery's "Cotton in the United States," a mill of 4,000 spindles was stated to cost for machinery, including weaving, \$13.75, or 2*l.* 17*s.* 3½*d.*, per spindle; and including buildings, &c., \$20, or 4*l.* 3*s.* 4*d.*, per spindle. This may include houses, but the fact is not clear.

From another source it would seem that "mills cost from \$20 to \$30, or 76*s.* to 112*s.* 6*d.*, per spindle for mills alone, including ma-

chinery ready to produce; and with villages, \$25 to \$40, or 93s. 9d. to 150s., per spindle." The first rate represents in each case the cost of economical establishments, and the second rate that of palaces.

It will be recollected that Mr. David Wells, in his well-known report of 1869, states that "in the cotton manufacture the mill and machinery which could have been put in operation at a cost of \$15 to \$17 per spindle in gold in 1859-60, would now cost \$30 to \$33 in currency," which was about \$22.50 to \$24.75 in gold per spindle, or about \$24 to \$27 currency in 1872-73, or 90s. to 101s. per spindle.

In the course of the discussion before the Massachusetts Legislature in 1871, as to the proposed Ten Hours Labor Bill, it was stated by the treasurer of a sheeting mill driven by water-power, that the investment "in machinery, dams, fixed capital, &c., was very large, and in their case was \$1,200, or 225l. per hand." At fifty-two spindles per hand,—the average rate in such mills in the United States,—this would give a little over \$23, or 86s. 3d., for spindle, probably for the mill and the necessary houses for its operatives.

It appears, moreover, that the cost of construction is, as a rule, the same for a mill with water-power as for a mill with steam-power.

The construction account of a mill is not an account with certain items invariably included, and certain others invariably excluded. Some of the variations in the quoted rates per spindle may be attributed to this fact. After due consideration, I am disposed to think that in the United States a mill as defined can now be built, on an average, for the \$20 and \$25 respectively, or 75s. and 93s. 9d. respectively, as stated in paragraphs preceding, according to the exclusion from, or inclusion in, the cost of construction of the workmen's houses.

Distribu-
tion of cost
of construc-
tion.

In this rate of \$20 per spindle, it is probable that \$4, or 15s., would be for land; \$7, or 26s. 3d., for buildings; \$6, or 22s. 6d., for machinery; \$1.50, or 5s. 7½d., for power; \$1.50, or 5s. 7½d., for sundries to complete and start.

The recent rise in iron would probably add nearly one-third, or \$2 to \$2½, to this \$7½ for machinery and power, making the rate per spindle \$22 or \$22½, or 41. 2s. 6d. to 41. 4s. 5d.

Items of
cost of con-
struction.

I am enabled to insert here, before closing my report, a *pro forma* statement of the cost of construction of a cotton mill of 41,784 spindles and 1,008 looms, exclusive of real estate, for which I am indebted to the courtesy of an eminent manufacturer.

Cost of a 41,784 Spindle-Mill in 1871.

	Dolls. cts.	£ s. d.
For Buildings complete	284,575 98	53,357 19 9
Machinery	247,792 02	46,461 0 0
Engine	23,504 22	4,407 0 9
Boilers	12,610 02	2,364 7 6
Shafting	18,183 26	2,471 17 8
Belting	11,865 04	2,130 18 11
Steam and gas pipes	10,066 24	1,887 8 5
Fire pumps and hose	6,000 00	1,125 0 0
Bobbins	8,000 00	562 10 0
Reeds and heddles	5,000 00	987 10 0
Tools for repairs, for grading, &c., and for sundry supplies for starting mill	26,014 55	4,877 14 7
Total	648,111 28	120,563 7 2

This gives a rate for the items named of \$15.39, or 2*l.* 17*s.* 8½*d.*, per spindle. I am informed that there should be added for cost at present time 25 per cent on the above cost of machinery, engine, boilers, shafting and belting, say \$77,113.64, making a total of \$720,224.92, or 135,042*l.* 3*s.* 6*d.*, and giving a rate of \$17.24, or 3*l.* 4*s.* 8*d.* per spindle.*

b. Plant.

76. The machinery for the motive power will be noticed in the next subdivision. The machinery for spinning and weaving cotton differs in some respects from that which one usually sees in Europe, and in several cases seems to differ with advantage to the American manufacturer. The differences which are the most striking to an unmanufacturing observer are the railway for the cards, the ring and its traveller, the improved spindles, and the fancy looms. It should be noticed that the stop motion is always applied whenever it is practicable to do so, and can be seen on cards, looms, reelers, &c.

In the preparing department, the openers are often from England of the latest approved form, usually in combination with scutchers (pickers) and lappers. But there are some excellent machines of American make. Of these Kitson's compound opener and lapper seems to obtain much favor. The maker claims for it that it opens and cleans 300 lbs. per hour and puts them up into laps, which do not vary a

* October. — This rise in the price of iron has been succeeded by a decline to as low a point as in 1871. — J. P. H. G.

quarter of an ounce to the yard, at the cost of only one mill (.045d.) per lb. of produced cloth. It does as much work as the ordinary breaker lappers and an opener, and does better work than they do. This has beaters; the toothed cylinders do not seem to be in favor. In some mills the laps are mechanically carried up a kind of ladder to the cards. Where scutchers are still separately used, they are built lighter than the English. There are several forms of finishers, scutchers, and lappers. The opinion, however, seems to be gaining ground that it is better to perform all these operations at one operation. In some mills the selvages are cut even, and the waste put through the machine again.

Carding
plant.

Cards
lighter.

The carding engines are universally single carders and smaller than is usual in England, and generally have 36-inch cylinders. They are, or will soon be, self-strippers. They are almost exclusively, if not exclusively, of American make. There are some differences between them and English forms. It is claimed for them that they are lighter built, are cheaper in cost, can run with economy quicker, and do better work than the English. In some mills the breaker cards deliver two slivers instead of one. In this the two slivers are placed on a new machine and rolled up three on a side, thus trebling instead of doubling for the finisher. But usually the card engines are connected together by the "railway" of American origin with an "evener," and deliver their slivers in a lap at the breaker railway head of the necessary thickness. This arrangement applies with the necessary differences both to breaker and finisher cards. The "evener" is an ingenious contrivance for regulating the thickness of the weight of cotton coming through, and prevent unevenness from the breaking down of one or more cards of the row. The trough is still to be found in use. Grinding seems still to be usually done with the slow emery roller. A girl at \$5 a week, instead of a man at \$10 a week, can mind self-stripping cards with railway-evener arrangements. With regard to drawing frames, it may be remarked that they usually have four heads or deliveries.

Drawing
plant.

The slubbing, intermediate, and roving frames, which are usually of English make, call for no particular remarks from an untechnical observer. They have to a large extent taken the place of the "speeders" and "extensers" of older times. It is obvious that in the carding department the Americans save labor, and gain all the advantages of low and light-built cards.

77. In the spinning department of American mills are to be seen

throstle spinning, fliers, caps, and rings with their travellers; mainly ^{Spinning plant.} the last. The cap is preferred by some spinners for certain purposes, and similarly the flier still holds its own. But the ring spinning is ^{Ring spinning.} the great feature of American spinning which strikes the stranger. The most ingenious part of it is the employment of the resistance of the air to do the winding. Opinions differ somewhat as to the limits of its advantageous use, but do not differ at all as to its advantageous use within certain limits for certain purposes. The ring spinning, as now practised with improved travellers and other improvements, has, it is claimed, an advantage of 25 to 40 per cent over the flier for certain kinds of yarn. This advantage seems to be derived from the higher speed or lesser power at which the spindles can with economy be run, and from the time saved in doffing. One girl minds 1,300 spindles. The Sawyer spindle is an improvement ^{Sawyer spindle.} of recent date, and owes its invention to a drought at Lowell, and the consequent necessity of trying to run the machinery with less power. It does away with some of the superfluous weight of material to be found even in the best machines. The lessening of the weight of the spindle brings about an acceleration of the speed, or a decrease of the required power. An improved Sawyer spindle gives still greater ^{Same improved.} advantages. The new spindle will, it is claimed, in connection with the ring and traveller, do 50 per cent more work than the English throstle spinning, in say 20s. running 9,000 revolutions. The new spindle saves in space, cost of plant, and power, but may increase working expenses per area, for with higher speed comes greater chance of breakage. Moreover, it has yet to be tested by long running, however sound in principle it looks. Another way of stating the advantages (with ring spinning) of the Sawyer spindle, is, that it weighs eight ounces instead of one pound; that it saves one-half of the spinning power, or one-sixth of the whole power, in a mill, and in its newest form saves a further 15 per cent; that it requires only fifty oilings a year at the bolster and four at the stops, and that it will do 20 per cent more work for the same pay, and in newest form even 50 per cent more work. Or, again, the total economy is estimated at 80 per cent of the cost of spinning. In the Sawyer spindle the steadiness is obtained by carrying it up in a grooved chamber to one-half or two-thirds of the bobbin. The bobbins wear out faster than under other circumstances, but the advantages are so great that this small extra outlay can be well afforded. The newest spindle will run with ease and economy 10,000 revolutions. The yarn produced seems to

be more like mule than throstle yarn. With all these improvements it is supposed by some that the frames will drive out mules for all numbers under 100 within a very short time. At any rate, ring spinning is fast superseding mule spinning.*

Mules. The mules are self-acting, usually of English pattern, and frequently of English make. American machinists have modified them and sometimes simplified them, but there appears to be no such appreciable improvement from these modifications as to do away with the general preference for the English patterns, usually Platt Brothers or Higgins patterns.

Continuous spinning. There are several attempts being now made to achieve a machine for continuous spinning. Two, if not three, of them are said to be of promise. One which can be adapted to cotton, woollen, and worsted, will, it is affirmed, save one-half of the labor in spinning. For a second, which can be applied to woollen, and, doubtfully, to cotton, as much is claimed.

Warpers. 78. In the preparation for weaving, a new warping machine, with one skilled man and two boys, does two and a half times as much work as the upright mill, and, in addition, links the work. The continuous warper is of American origin. There are one or two new forms of spooling machines which are said to have advantages. The "slasher," with its warper, is driving out the usual "dressers." It has already had some American improvements put upon it,—puts the mark on in the dry, and has in the warper a half-speed pulley instead of some complicated gearing. It seems to work up to 800 pieces of 45 yards per day, and is said to do the work of ten or eleven dressers.

Weaving plant. In weaving, the English Bradford looms seem to be often selected for print cloth, whilst the American Crompton looms seem to have the larger share of favor for fancy weaving. The looms of American make seem to be more lightly built, and the reason is said to be that the American iron is better than the English, and, size for size, stronger, or, strength for strength, lighter. Whether or not the fact be characteristic of the iron used in the English machinery, it appears that a frequent ground of complaint arises out of the brittleness of English machines imported, for they not seldom break from the jolting between the station and the mill. The American iron for such machines is usually a mixture of native iron and Scotch pig. In consequence of the looms being lighter than the English, they are run

* See also trials in paragraph 272.

with a saving of power which is said to be sometimes as much as 50 per cent. Except in the print cloth looms, it is claimed (apparently with reason) that the American looms, like the cards, excel the English looms. The newest improvement in the Crompton looms is in the heddles (harness), and consists in a new mechanical action which works better, and in a saving of material. The speed is not thereby increased, but power is saved, and a better article is produced. The drop shuttle-box is preferred to the revolving. In competition with the Crompton looms are some other looms, such as the Knowles' looms, and in their rivalry a yet better loom will, it is said, soon be introduced. It will be remembered that the self-acting temples were in use in the United States long before they were in England.

The print looms work successfully to 180 and even 200 picks a minute. The fancy looms run on gingham from 135 to 145 picks, and on shawls and fancy work (with six-shuttle box) from 130 to 135 picks a minute. The older looms in use do not reach this average; for instance, some looms running on gingham make only 30 yards a day of 11 hours, at 105 picks a minute. The Lowell Statistics for 1872 record the medium produce of a loom, No. 14 yarn, as 45 yards, and No. 30 yarn as 30 yards per day; the week being taken at 62 to 64 hours.

Narrow fabric looms will be referred to under silk.

Gigs (*vide* also wool plant) of English pattern and make are usually preferred to the American. There is an American napping machine (Ladd's) used for cotton flannel, which is said to have advantages. It takes up a smaller space, and is less liable to disarrangement than other machines; it maps both sides, and has a contrivance for adjusting the pile.

79. In bleaching and dyeing there is little for an untechnical observer to notice, except that in one mill, and perhaps in others, the comfort of the hands is secured by covering in the vats and carrying the steam off in shafts. The pleasure of being able to see more than half a dozen feet in a dye-house is a peculiarly agreeable sensation.

80. In printing, the plant is said to be about the same as in England. The printing machines are each run with separate power, and can print 360 to 400 pieces a day. Aging is effected by hot rooms, except for special goods. Singeing is usually accomplished by the red-hot cylinder, but in one instance, at least, is accomplished by passing the calico through a carbolic acid gas flame as well as over the red-hot cylinder. The finishers do the starching, dyeing, and

prices for the following machines, without distinction between foreign and native :—

	Dols.	£ s. d.
Carding engines, 36-inch	210	89 7 6
Lapping machines, 36-inch, 3 beaters	1,300	243 15 0
Drawing frames, 3 heads	210	89 7 6
Double speeders, per spindle	16	8 0 0
Extensers (or substitutes)	14	2 12 6

And also with the following prices of best machines for fine numbers in 1871 :—

	Dols. cts.	£ s. d.
Opener (and scutcher)	1,186 50	222 9 5
Lap machine, 36-inch, 2 beaters	1,243 00	233 1 3
" " 1 beater	1,060 90	197 0 11
Coupler and lap machine	1,480 00	277 10 0
Derby doubler	977 45	183 5 5
Cards, self-stripping, complete	265 85	49 17 5
Railway heads, per 8 cards	265 00	49 13 9
Heads, 1st drawing	220 00	41 5 0
" 2d	230 00	43 2 6
Slubbers, 40 spindles, each	19 21	3 12 0
First intermediate, 102	14 12	2 12 9
Second intermediate, 120	9 72	1 16 6
Jack frames, 160	7 91	1 9 8

The prices in Lowell, as seen from comparative table in the third In Lowell. division of this part, are as follows :—

Prices of Machinery at Lowell, 1872-73.

	Dols.	£ s. d.
Scutcher or spreading machine	1,650	309 7 6
Carding engine, 37 inches broad, 36 inches diameter	210	89 7 6
Lapper	650	121 17 6
Drawing frame, 3 heads	500	93 15 0
Speeder, 24 spindles	800	150 0 0
Second speeder, 36 spindles	850	159 7 6

83. In the spinning department I am enabled to quote from the In spinning. same sources respectively prices as follows :—

	Dols. cts.	£ s. d.
In Pennsyl- vania.		
Of American-made machines—		
Ring, frame throstles, 204 spindles, per spindle	4 50	0 16 10½
Self-acting mules, 500 spindles, 1½-inch gauge per spindle	8 20	0 12 0
Doubler and twister, 48 spindles, 5-inch bobbins, 8 inch heads	425 00	79 13 9
Doubler and twister, 96 spindles, 5-inch bobbins, 8-inch heads	750 00	140 12 6
Reels, for bobbins, 60 spindles, Jenks' patent	175 00	82 16 8
Yarn press, improved	60 00	11 5 0
In New England.		
Of machines without distinction of origin—		
Ring throstle spindles for frames, each	8 50	0 13 1½
Mules, spindles, each	2 75	0 10 3½
Of the same for fine numbers in 1871—		
Self-acting mules, per spindle	2 58	0 9 6
At Lowell.		
Of machines at Lowell—		
Spinning frames, 128 spindles	575 00	107 16 3

In dressing and weaving. 84. In the dressing and weaving departments I am similarly enabled to quote prices, as follows:—

	Dols. cts.	£ s. d.
In Pennsyl- vania.		
Of American-made machines—		
Spooling frame, 80 spools with spindles	300 00	56 5 0
Warping mill, 180 eyes, 20 yards	200 00	87 10 0
Sizing troughs with iron squeezers and pipes	150 00	28 2 6
Dressers, with equipment	1,100 00	206 5 0
Warping mill with drop wires	170 00	81 17 6
Beaming machine	160 00	80 0 0
Looms—		
85-inch or 40-inch, plain goods	65 00	12 8 9
40-inch, fancy goods	85 00	15 18 9
40-inch, for satinets top mounting	100 00	18 15 0
40-inch, fancy, with 2, 3, 4 shuttle-drop boxes for trouserings, vests, Jenks' patent	100 00	18 15 0
Jacquard's fancy table-cloth loom	115 00	21 11 3
Of machines without distinction of origin—	120 00	22 10 0
Dresser, with warper	95 00	17 16 8
Slashers, according to equipment	600 00	112 10 0
Looms, including mounting	1,600 00	300 0 0
Of the same for fine numbers in 1871—	2,600 00	487 10 0
Spoolers, 100 spindles, per spindle	85 00	15 8 9
Warpers	120 00	22 10 0
Sizing machines (slasher?)	2 70	0 10 1½
Looms, 40-inch	200 00	87 10 0
Of machines at Lowell—	2,288 25	429 1 0
Warping mill, complete	80 00	15 0 0
Looms	250 00	46 17 6
	86 00	16 2 6

I regret that I am not able to complete the sketch of the plant in cotton manufacturing by prices of machines for printing and hosiery.

85. The kind and proportionate number of each class of machinery in a mill vary much, and even on the same class of goods, for no two mills are alike. In certain local statistics the following proportions appear:—

Mill No. 1 (print cloths) —

1 Opener.

4 Scutchers and lappers.

96 Cards.

28,000 Spindles, 28s. to 34s. (4 to 5,000 revolutions).

590 Looms (150 picks).

Mill No. 2 (print cloths) —

11 Scutchers and lappers.

310 Cards.

88,400 Spindles.

MILL.		Spindles.	Looms.
1	Print cloths	105,568	2,588
2	Sheetings, drillings, and shirtings, Nos. 10 to 37	77,002	2,091
3	Sheetings, drillings, and shirtings, No. 14	27,088	764
4	Sheetings, jeans, gingham, cotton, flannel, &c.	38,280	750
5	Ginghams	9,000	800
6	Yarn, Nos. 8 to 25, cards 32	17,000	. . .
7	Sheetings, drillings, and shirtings, and printers, 80 to 40	92,060	2,000

Moreover, I have been favored by the following list of machinery in a mill for fine sheeting, producing the best class of shirting in the United States, 100 by 100 picks, 28 warp, 36 weft, all mules:—

1 Van Winkle opener.

1 First lapper.

2 Second lappers.

52 Carding engines, 36-inch self-strippers, single carding.

4 Railway heads.

8 First drawing heads.

12 Second drawing heads.

150 Slubber spindles (first operation of speeders).

300 Intermediate (or second operation of speeder).

1,100 Fine speeders.

10,000 Mule spindles, 1,280 spindles per pair.

Spoolers.

Warpers.

8 Dressers.

210 Looms, running 135 picks.

This machinery would require 100 horse-power to drive it. If this mill were producing goods 64 by 64, it would require 825 looms at 140 picks to use up the product of the above machinery. This machinery would in the first case be at the rate of \$8.25, or 30s., per spindle, and in the second case of about 1*l.* 13*s.* 9*d.* per spindle. The prices for 1873 would be rather higher.

Machinery and its cost in a mill. 86. I am enabled to insert here, before closing my report, a *pro forma* statement of the machinery and its cost of a "fine" mill of 30,000 spindles in 1871, for which I am indebted to the courtesy of an eminent manufacturer. The machines are the best, and are selected without distinction from machines of American or English pattern and make.

Machinery for 30,000 Spindle-Mill, Fine Goods.

	Dols. cts.	£ s. d.
1 Opener	1,186 50	222 9 5
2 Lap machines, 8 beaters, 86-inch	2,486 00	466 2 6
1 " 1 " " "	1,050 90	197 0 11
6 Combers and lap machines "	8,872 76	1,668 12 10
1 Derby doubler	977 45	188 5 5
80 Self-stripping cards, complete, \$265.85 each	21,268 00	8,987 14 0
10 Railway heads, \$265 each	2,650 00	496 17 6
10 Heads, first drawing, \$230 each	2,200 00	412 10 0
6 " second " " "	1,880 00	258 15 0
4 slubbers, 40 spindles each, \$19 21 each	8,073 60	576 6 0
4 First intermediate, 102 spindles each, \$14.12	5,763 00	1,080 11 0
10 Second intermediate, 120 spindles each, \$9.72	11,664 00	2,187 0 0
24 Jack frames, 160 spindles each, \$7.91 each	80,874 40	6,695 4 0
40 Self-acting mules, 29,792 spindles, \$2.58	75,878 76	14,132 11 7
8 Spoolers, 100 spindles each, \$2.70 each	2,160 00	405 0 0
8 Warpors, \$200 each	1,600 00	800 0 0
1 Sizing machine	2,288 25	429 1 0
450 Looms, 40-inch	86,000 00	6,750 0 0
Total	210,868 62	89,444 1 2

This aggregate cost of machinery is at the rate of \$7, or 1*l.* 6*s.* 3*d.*, per spindle.

Rates per spindle.

To the same source I am indebted for a *pro formâ* statement of the cost of a cotton mill of 41,784 for print cloth in 1871 (*vide* paragraph 75), in which the machinery for spinning and weaving as above, *mutatis mutandis*, costs \$247,792, or \$46,461*l.* sterling, being not quite 1*l.* 2*s.* 3*d.* per spindle. In consequence of the recent rise in

prices, my informant considers that 25 per cent should be added to these prices for present cost.*

In consideration of the data adduced, it may be affirmed that the minimum rate per spindle for machinery, exclusive of the movers, was, before the recent rise in prices, about \$6, or 1*l.* 2*s.* 6*d.*, and would now be \$7.25, or 1*l.* 7*s.* 2*d.* Rate per spindle.

The efficiency of the plant can be better treated in connection with the factory labor in the subdivision *f*. (See paragraphs 149 to 155.)

87. It would be of interest to obtain some idea as to what changes in cost of machinery may be accomplished in the United States. The probable range of price in iron has been already noticed (paragraph 72). The manufacture of steel, almost exclusively cast and Bessemer steel, is rapidly and largely increasing. Some improvements to lessen manual labor and save time have been made in the Bessemer plant. In 1870 the condition of the manufacture of steel may be thus inferred from the census returns : — As to reduction in cost of plant.

Steel.
Cost of production.

Per Ton of Product in the United States.

	Dols. cts.	£ s. d.
Iron of all kinds and coal	90 25	15 8 5
Other materials	13 08	2 4 8
Labor	35 00	5 19 7
Remainder	53 87	9 8 7
Value	192 20	82 16 8

Products in Steel, 1870.

	Tons.	Dollars.	Per Ton.	
			Dols. cts.	£ s. d.
Puddled steel	1,185	218,500	184 40	34 6 6
Blistered steel	1,000	230,000	209 09	35 14 5
Bessemer steel	19,408	1,818,220	93 68	16 0 1
Cast steel	23,069	7,236,188	259 16	44 5 6
Total	49,757	9,552,908		

There were some other products, of the value of \$57,078, representing, say, 243 tons; then the aggregate production was 50,000

* October 31. — This is no longer the case. — J. P. H. G.

tons, of a value of \$9,609,986. The proportion of coal consumed to iron converted was for all products an average of $3\frac{1}{2}$ tons of coal to 1 ton of iron of all kinds, or nearly $4\frac{1}{2}$ tons of coal and $1\frac{1}{2}$ tons of iron per ton of product. It will be recollected that the coal used is anthracite in some iron regions and bituminous in others.

Reduction
in iron and
steel.

88. It is obvious that, if the cost of labor in the materials of iron and coal could be reduced, as well as the cost of labor in the manufacture of steel itself, a proportionate and large diminution of price would follow. It is expected that the various new processes, which I have neither time nor space to enumerate in this report, in the manufacture of iron and steel, and especially of iron, will cheapen by from one-third to one-half the cost of production. If, in addition, the rate of wage could be lowered by reducing the cost of living, there would be a yet larger and more sure cheapening of the cost of production.

Cotton ma-
chinery in
the United
States.

89. The special statistics of the 1870 census do not give any details separately of the manufacture of cotton and woollen machinery. The following articles, with the quantities, are enumerated:—

PRODUCTION OF COTTON AND WOOLLEN MACHINERY IN 1870.

Bobbins and spools	gross	2,053,822
Cards		1,340
Hand cards	dozens	44,264
Flyers		5,000
Harnesses		88,292
Looms		6,549
Bleaching machines		80
Braiding machines		268
Drying machines		100
Knitting machines		9,521
Printing machines		42
Spinning machines		72
Mules		252
Loom-pickers		5,400
Wool-pickers		20
Reeds		41,552
Rolls		116,500
Ring-travellers, belt-hooks, &c.	pounds	187,185
Shuttles		617,928
Speeders		113
Spindles		221,714
Spinning frames		818
Miscellaneous and repairing, cotton and woollen	dollars	4,162,883

From the general statistics, the following particulars can be quoted Labor thereof.
for cotton and woollen machinery together:—

Establishments	88		
Horse-power	5,926		
Hands employed	8,918		
Capital dollars	10,608,424	=	1,811,418 <i>l.</i> sterling.
Wages "	4,682,918		791,456 <i>l.</i> "
Materials "	5,246,874		896,841 <i>l.</i> "
Products "	18,811,118		2,278,988 <i>l.</i> "

From these data it would seem that the wages are rather more than one-third, or 34½ per cent, and the materials nearly two-fifths, or 40 per cent, of the value of the product. The average annual wage per hand is about \$509, or about 86*l.* 16*s.* The sterling is Wages therein. found at the average exchange for 1869–70.

The machine shops of the United States are well equipped, organized, and managed, and certain establishments not only rival European, but even, in some respects, excel the best in England. With larger experience will come greater average economy of manufacture. But the cost of production can only be materially cheapened, as in Reduction of cost. other manufactures, by an increase of labor-saving machinery, and a decrease of the cost of living.

90. As regards imported machines, the tariff is said to add, on an Imported machinery. average, one-third to their value. Notwithstanding this duty, many English machines are said to cost less in the mill than the similar or analogous American machines. As may be inferred from the statement of machines made in the United States, and the fact of an estimated importation * of about \$2,000,000, or 417,000*l.*, annually of cotton, woollen, and worsted machinery, the cotton machinery in the United States is, to some extent, English, except in respect of cards and looms. Except in a few cases, the cost of Amer- Cost of. ican-made machines is said to exceed that of analogous English machines on an average by about 80 per cent. This excess does not seem to be caused by any inordinate profits of the machine-makers, but by the cost of material and labor. For in the discussion before the Massachusetts Legislature as to the proposed Ten Position of American machine shops. Hours Labor Bill, a machine-maker testified that the loss of one hour's production a day would ruin him in competition with machine

* "Machinery," in 1871, is returned at \$900,000, and unspecified iron and steel manufactures at \$4,900,000 nearly. It is said that with "unspecified" is much machinery.

shops in other parts of the Union, and also that his profits in the years 1868-71 had not exceeded one-eleventh of the wages he had paid out. If this statement hold true of the aggregate production of cotton and woollen machinery, then the profits (including interest) of the machine shops of the United States were, in that period, on an average about 16 per cent on the returned capital, that rate being calculated from the returned wages in the 1870 census.

Craven
patent.

91. A machine has been recently patented by a Mr. Craven, I believe, for preparing unginued cotton for spinning. It is claimed for this machine that 3 to 4 cents will be saved in the purchase of cotton, and 15 to 20 per cent in the cost of spinning. If this be so, the machine will be of great advantage in the South.

Geldard on
American
machines.

From Mr. Geldard's Treatise on Cotton Spinning, I add the following extracts respecting American cotton machinery, and especially with respect to the advantages of the "evener." For further information in regard to American plant, and especially ring spinning, I beg to refer my readers to Evan Leigh's science of "Modern Cotton Spinning," for a perusal of which I have been recently indebted to the courtesy of Mr. Leigh, of Boston.

MACHINES.

Mechanicians have always disagreed as to the best mode of conveying power from the prime mover to the machinery to be impelled. Some prefer gearing, some belts and pulleys, while others prefer a mixture of both. Doubtless each system has its advantages. All agree that, to convey the power by the shortest possible train, first to the heaviest and then the lighter machinery, is correct both in theory and practice.

Whatever system is adopted, the mode of finding the proper gears, pulleys, speed, &c., is substantially the same.

Many prefer very light, well-balanced pulleys and shafting, and counterbalance the want of weight and strength by having a small driven wheel or pulley near the prime mover, and small driving pulleys near the machinery to be impelled, which gives a proportionately increased velocity to produce the same momentum. This system greatly reduces the inertia to be overcome, and tends to more uniform impulsion and utility of the power applied.

The Willow.—The willow is the first machine to which the cotton is subjected in its process of manufacture.

The cylinder of a Bacon willow contains 1,036 claws, and makes

500 revolutions, more or less, while the feed-rollers feed one pound of cotton, displaying $1,036 \times 500 = 518,000$ claws in rapid motion. These tease the cotton into as many loose tufts, and, as far as is practicable, undo what has been done for convenience in transportation; free it from a superabundance of moisture and other impurities; and by the force of wind, created by the motion of the cylinder, carry it into a ventilated room convenient to the lapper.

The Lapper. — As will subsequently be shown, the lapper is the machine at which the cotton first receives definite form and size.

Some manufacturers contend that the size or decimal of a hank produced at a lapper cannot be depended upon as being positive; that at best it is but an approximation and guess at the quantity of cotton spread on to the lattice, substituting an "evener" for the old system of spreading a definite weight on to a definite length.

The Whiting lapper is the one most generally appreciated in this neighborhood, — being easy to manage, not liable to get out of order, and, with proper weighing, produces good and truthful results.

Carding Engine. — What the willow and lapper perform in part, the carding engine completes in a thorough cleansing of the cotton.

The main cylinder of a common-sized carding engine, when carding for medium numbers, makes about 120 revolutions per minute, and contains twenty-two sheets of clothing, each 30×4 inches, containing 400 teeth to the square inch, and cards one pound of cotton every twenty minutes, more or less. Hence, every pound of cotton is picked from the feed-rollers, fibre by fibre, by $120 \times 22 \times 80 \times 4 \times 400 \times 20 = 2,584,400,000$ diamond-pointed teeth, which, by their traction and that of the top cards, or slats, untangles the fibres, and lays them more or less parallel to each other, and, by suitable apparatus, delivers them formed into a "sliver."

The railway head, treated on below, has four pairs of rollers, with "Draper's Patent Evener" attached, adapted for twelve cards.

The roller next to the front roller is called the front middle roller, and the roller next to the back roller is called the back middle roller. The front roller is driven from the back roller by a train of three pairs of wheels and one pair of cones. The back middle roller and the front middle roller are each driven from the back roller by one intermediate wheel.

The tube through which the sliver passes, and the apparatus for moving the belt on the cones, are so adjusted that, if the fleece delivered from one of the cards should break, they will cause the belt

to move from the large end of the driving cone sufficient to reduce the speed of the front roller one-twelfth; and if the fleece should break from two cards, two-twelfths, &c., thus keeping the sliver delivered of a uniform size.

Railway Head, with Draper's Patent Engine attached. — The following tables and remarks were furnished by Mr. George Draper, Hopedale, Mass.

Below I give a table showing the actual result of the use of the eveners in the Boott Cotton Mills at Lowell, from July 19 to August 4, 1866. The drawing from each of the heads was weighed carefully over 150 times. The standard aimed at was 79 grains (*between the black lines*) for a given length. The drawing was straightened out, a strip of board laid on, and the drawing cut off at each end with a sharp knife, and then carefully weighed. Mark the result: any weighing not varying more than 4 or 5 grains from the standard, either way, would make comparatively little difference. That weighing 72 in number 20 yarn would vary one number one way, and 83 one number the other way. That with the evener, in weighing 156 times in three weeks, varied more than that only four times, — twice 73 and twice 74. Now look at the other weight at the same time and under the same circumstances, except the evener. Out of 153 weighings, that weighed 75, 7 times, and more than 83, 23 times. The one with the evener weighed right, or within one grain of right, 86 times; while the one without the evener did but 50 times. In one the weighings are between 73 and 83; in the other, scattered from 73 to 88.

N.B. — The above is by some called Hayden and Wylls's Patent Evener.

Table of Weights where the Evener was used.

	Gr. 73	Gr. 74	Gr. 75	Gr. 76	Gr. 77	Gr. 78	Gr. 79	Gr. 80	Gr. 81	Gr. 82	Gr. 83	Gr. 84	Gr. 85	Gr. 86	Gr. 87	Gr. 88
Weights . . .	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88
Times . . .	2	2	16	20	17	31	25	30	9	3	1	..	..	..	..	..

Table of Weights where the Evener was not used.

	Gr. 73	Gr. 74	Gr. 75	Gr. 76	Gr. 77	Gr. 78	Gr. 79	Gr. 80	Gr. 81	Gr. 82	Gr. 83	Gr. 84	Gr. 85	Gr. 86	Gr. 87	Gr. 88
Weights . . .	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88
Times . . .	2	5	11	20	12	16	20	14	13	9	8	12	4	4	2	1

c. Power.

92. This part of the subject will be best treated by grouping the

remarks thereon under steam-power and water-power, and the transmission of power. It has already (paragraph 14) been noticed that, taking cotton mills throughout the United States, the water-power used is double the steam. But taking the large manufacturing districts, it is doubtful that the water-power will maintain its higher proportion of the power required. At any rate, it may be affirmed that in such districts the advantage of having water-power is no longer a consideration in choosing the site of a mill. The site is selected for other considerations which claim prior attention. One reason of this seems to be that the relatively greater rise in unskilled labor, which is much required in drains and trenches, &c., has diminished the relative advantage of water-power.

Water-power.

In regard to steam-power, the first remark to make is, that there are numerous kinds of boilers in use, from the old-fashioned boiler to the plain tubular or locomotive boiler. Of the many new boilers there is, in New England, one of some promises — the Müller or Miller boiler. It is a kind of reverberating furnace, with wrought-iron tubes for the water, at a certain angle over the fire, and a steam-box. It has, however, only 10 to 12 feet, instead of the usual 18 feet, of heating surface; but, although this is the objection sometimes urged against it, the fact is surely in favor of the Müller system of generating steam. It does, as is claimed for it, secure 50 per cent more work than the usual boilers in the best mills. It saves more than half the cost of fuel, inasmuch as it will give, with three tons of coal dirt and one ton of coal, the same power as ordinary boilers with four tons of coal. In Pittsburg an "Eclipse Sectional Boiler" is attracting attention for equal advantages.

Steam-power.

Boilers.

Exhaust steam is often used to heat the water for the boilers.

93. In steam-engines the American makers excel, and the "Corliss cut-off" engine has a world-wide reputation. Many of the cotton mills have magnificent engines. There may be some beam engines, but usually, if not universally, the engines are no longer beam engines. This feature cannot fail to strike the visitor to American mills. The "Corliss-cut off" engine, in varied modification, is the most general. A "Green's cut-off" is sometimes seen, and is said to compete closely with the "Corliss." The economy of the "Corliss cut-off" was stated a few years ago to be that of using two tons of coal in place of every 6½ tons used for other engines. The "Corliss" is not, however, universally approved; and in some mills other engines are erected, on the ground that the greater complication of the "Corliss,"

Engines.

and the consequently increased cost of repair, sometimes prevent the economy from being felt.

Fuel.

Coal is a serious item in the use of steam-engines, and, as has been before remarked, is usually taken in the large cotton-manufacturing districts as costing \$6 to \$7 a ton, according to locality. Coal may, in fact, be taken for the cotton mills of the United States at \$6. The possibility of its becoming cheaper will be noticed under the head of "Mill Supplies." (*Vide* paragraphs 112-118.)

Consumption of coal.

94. A steam-engine is usually said to require 40 lbs. of anthracite coal per day of 11 hours per nominal horse-power, which is nearly the effective horse-power. This represents nearly $3\frac{3}{4}$ lbs. per horse-power per hour. In England, with Greene's economizer, I believe the quantity of coal consumed per horse-power per hour is only 8 lbs. The anthracite coal can scarcely be said to give at present any advantage to American mill-owners. It is possible that, with the improvements now maturing in engines and boilers, the consumption of coal per horse-power will soon be generally reduced below the English average, and approach the ideal 1 lb. of coal. We may never succeed in extracting and utilizing all the latent heat in a pound of coal, but if we ever use one-half of it, that ideal 1 lb. per horse-power per hour will become matter of fact, and we shall wonder at our former wastefulness. Taking, however, the average consumption for the United States at $3\frac{1}{2}$ lbs. per horse-power per hour, then the cost is about 1 cent, or $0.45d.$, averaging the steam-engines in the United States for cotton manufacturing. As 1 horse-power is usually said to be the power necessary to drive the machinery represented by 100 spindles in a fine mill, the cost of power in fuel alone is the 1 cent per 100 spindles. This shows a cost of $\frac{1}{4}$ of a cent, or $\frac{1}{16}$ th of a penny, per yard, or nearly 1 cent per pound of fine sheeting. The average for the United States may be taken at a maximum of 1 cent, or $0.45d.$, per pound of product.* The oil and other supplies, and small repairs, cost on an average $1\frac{1}{2}$ mills, or $0.0675d.$, per pound; whilst the labor costs about $3\frac{1}{2}$ mills, or $0.1575d.$, per pound, making the total cost of power by steam about $1\frac{1}{2}$ cents, or $0.675d.$, or nearly $\frac{1}{16}$ ths of a penny per pound of product. The item for labor may seem low to those who are acquainted with the usual allegations as to the much higher cost of labor in the United States than in England; yet it is calculated on a liberal basis,—the engine-man being taken at \$3, or

Cost of steam-power.

* According to another calculation, taking 1 horse-power equal to 60 spindles, the annual cost of fuel per spindle would be about 58 cents. This gives $1\frac{1}{2}$ cents per hour.

11s. 3d., a day, and the laborer at \$10, or 87s. 6d., a week. It should, however, be remembered that anthracite coal only requires a half or two-thirds of the stoking of bituminous coal. In mills of less than 10,000 spindles, the labor may cost a little more.

In regard to water-power, it may be noticed that the turbine and breast wheel are almost universally employed for obtaining the power. There is little to remark about the utilization of water-power, except that, in respect of the turbine, which has been carried to great perfection, all efforts seem now directed to reduce its cost rather than increase its power. One improvement aims at achieving this by making the pockets of bronze in place of steel.

96. The cost of water-power will, of course, vary considerably according to the fall of water and the cost of labor at the date of it being utilized. A greater power at less cost can be obtained with wheels from a fall of 40 feet than from one of 15 or 20 feet. The fair average of power to take seems to be a 20-foot fall. The wheels and main gears would cost on an average about \$50, or 9l. 7s. 6d., per horse-power. The rent in Lewiston, Me., is \$6, or 22s. 6d., per horse-power per annum, for use 12 hours a day. At Lowell it is rather higher; but the power is really owned by the mills under a separate organization, so that the rate there is no guide for the whole country. The rate of \$6 seems a fair standard rate. In Rhode Island a higher class mill with good power, well situated, would, with main shafting and tenements for hands, rent at about \$1, or 8s. 9d., per spindle for these items. The average rate would, however, be about 75 cents per spindle.

According to Mr. Batchelder's book in 1863, where he quotes Montgomery on cotton at Lowell or Lawrence, the interest at 6 per cent on the purchase of a mill-power, and of land for the mill, will average about \$15, or 2l. 16s. 3d., per horse-power per annum. The rent for water-power also, in cases where the mills are not owners of the water-power, would appear to be from \$300 to \$500 per annum per mill-power of 62½ horses net, showing a rate per horse-power of \$5 to \$8.33½ only. In Holyoke the price is about the same. At Manayunk, Phila., the rent of water-power and land used to be (1863) about \$60, or 11l. 5s., per horse-power per annum. I am not aware that the price has been diminished. To these rents should be added a comparatively small expense for labor, oiling, &c., and for repairs. It is obvious that Lowell and Lawrence and a few places equally well situated, have, after deducting the value of land for the mill, advantages

in water-power which do not form, however, an average for the United States. I understand that no water companies with such profitable terms for mills as that of Lowell are now formed, although in 1863 it was considered that such is the superabundance "of water-power in New England and other parts of the country, it could be obtained in situations favorable for manufacturing for half the cost" at Lowell. The reason, or at least one reason, is, that the labor required in preparing the water-power for use has increased, as the cost of using steam-power has diminished. Another probably is, that the cost of freight is so much higher that this and other considerations of a like nature are of more moment in selecting the site for a mill than the advantage of a water-power.

I am indebted to "The Water-power of Maine" for the following facts:—

The cost of the water-power equipment at Lowell was, for canals and dams, \$100, and for wheels, &c., another \$100, per horse-power. But this, as a first experiment, was more costly than a similar equipment need be. At Saco the expense incurred was \$175 per horse-power; but at a later period, for turbines with high heads, the expense would be less. A construction and equipment, solidly carried out, with the latest improvements in wheels, would not cost over \$200 per horse-power, and would, under favorable circumstances, cost less. An estimate at Penobscot was for \$112.50 per horse-power. If the construction be with wooden dams, and the equipment with lower grade wheels, then the cost would be about \$50 per horse-power; and although the construction would be less permanent than the more solid, it would outlast any steam apparatus. On the other hand, Fall River estimates of steam equipment, exclusive of foundations and engine-houses, run from \$100 to \$115 per horse-power. A Boston authority gives \$115 per horse-power for nominal 300 horse-power and upwards, inclusive of foundations and masonry. Similarly a Portland authority places it at \$100 per horse-power. The actual cost of steam equipment in the water-works of various cities of the United States varies from \$150 to \$300 per horse-power.

As to the cost of work done, it appears that in Philadelphia in 1867 the cost of raising water by water-power was only $2\frac{1}{4}$ cents (or 1d.) per 1,000,000 gallon feet; whereas the cost by steam-power was in four cities $8\frac{3}{10}$, $11\frac{1}{10}$, $19\frac{1}{10}$, and $29\frac{2}{10}$ cents, with coal at \$5.50 per ton. The following was the cost in Brooklyn of raising 163 feet 1,000,000 gallons:—

	1862.	1865.	1866.	1867.
Labor, superintendence, repairs, &c.	12 22	18 74	19.84	18.20
Interest on cost of works	2 04	5 14	4.83	8 86

The coal cost \$7.11 in 1867.

The average per 1,000,000 gallon feet is 12 cents, and the cost per horse-power is 72 to 100 cents.

A Portland estimate showed for 20 horse-power a total cost of \$150 a year per horse-power for ten hours a day. The author of "Water-power in Maine" concludes that the saving of water-power over steam-power should be about 20 cents, or 9d., per horse-power per day of ten hours, when coal is at \$6 per ton, and that the saving by the use of water-power in Maine would be exceedingly large.

97. If the calculations in the preceding paragraphs be correct, then the cost of steam-power is, under favorable circumstances, from \$45 to \$50, or 8l. 8s. 9d. to 9l. 7s. 6d. per horse-power per annum. To this should be added, however, the extra cost over water-power of repairs, or machinery for steam-power. As compared with water-power, except at such places as Lowell, steam-power does not appear to be altogether disadvantageous. It is of moment to record the fact that, except in the Southern States, few mills rely all the year round on their water-power.* The losses which might therefore arise from floodings and draughts are either prevented or lessened. Supposing the steam-power costs no more at such a mill than at an all-steam mill elsewhere, then the economy of using water-power, whatever it may be, is for the favorable months, after subtracting the loss of interest on the fixed capital in the unused steam-engine and the small expenses connected therewith, a clear gain of the water-power mill in competition with the steam-power mill. On the other hand, in several instances such an expense for utilizing water-power has sometimes been incurred as would have rendered it cheaper to use steam-power. The cost of water-power per pound of product may with approximate accuracy be assumed to be about the same as steam-power, except in a few individual cases of unusual advantages. In such cases it may save from 1 to 1½ cents per lb. of goods made.

98. As regards the transmission of power, the Americans aim at achieving two important things which are correlative, — the lightest possible weight and the highest possible speed. Hence the universal substitution of belting for gearing, and the general adoption of light shafting and small pulleys, which are conspicuous features of their system of transmitting power. The first mover is usually a gear, but

* Vide Comparative Statistics of Lowell Mills in paragraph 199.

after that all transmission is obtained by belting. The belting is a little study in itself, but it will suffice to say here that belts of the latest improved pattern run for wonderful periods of time without piecing. The ease and durability of the system would, I think, astonish the advocates of gearing. The light shafting and small pulleys in general use are said to save 25 per cent of the power. The shafting is run twice as fast, and hence the pulleys can be smaller, yet the fly-wheel of a powerful engine may be large. For instance, I have seen one 27 feet in diameter going, as I was informed, a mile a minute. The pulleys are cast, but it is expected that wrought pulleys much lighter will soon come into general use. Hollow shafting is finding favor. If shafting and pulleys could be advantageously constructed of steel, the saving of power would probably be greatly increased.

99. Engines and their equipments, and belting, shafting, and pulleys, are all made in the United States. The 1870 census gives no special statistics for engines and boilers as distinguished from the machinery. But from the general statistics the following particulars can be quoted, the sterling being at the rate for 1869-70:—

Establishments	668	
Horse-power	11,840	
Hands	22,962	
Capital dollars	25,987,452	= 4,489,544 <i>l.</i> sterling.
Wages	12,572,244	2,147,759 <i>l.</i> "
Materials	19,784,404	3,371,294 <i>l.</i> "
Products	41,576,264	7,102,612 <i>l.</i> "

From these data it may be inferred that the wages and materials were respectively 30½ and 47½ per cent of the value of the product. The considerations which have been advanced in respect of the plant (*vide* paragraphs 87 to 89) apply equally to the construction of engines and shafting. The possibility of their cost of production being cheaper, depends upon a reduction of the cost of living and an increase of labor-saving machinery. In labor-saving machinery, however, I think it probable that in such workshops as the Corliss establishment its quantity is larger and its application more general than in English establishments of the same class.

100. An engine of about 400 horse-power would have cost in 1871 from \$20,000 to \$25,000, or from 3,750*l.* to 4,688*l.*, and would now cost nearly 30 per cent more. In the statement quoted in paragraph 75 of the cost of a printer mill of 41,784 spindles in 1871,—

	Dols.	£	s.	d.
The Engine costs	23,504	=	4,407	0 9
Boilers	12,610		2,364	7 6
Shafting	13,183		2,471	17 3
Belting	11,365		2,130	18 8
Being a total outlay of . . .	60,662		11,874	8 9

For the power required to drive the machinery represented by 41,784 spindles, and being at the rate of \$1.45, or 5s. 5d., per spindle. This rate would now be about \$1.81, or 6s. 9d., per spindle.* Saving of power.

101. In concluding this brief sketch of the application and cost of power in the cotton mills of the United States, it is desirable to state, by way of recapitulation, that it is claimed that the lighter cards and looms, and lighter machines generally, save 20 per cent and more of the power otherwise required, and that the American system of transmitting power by belting, light shafting, and small pulleys at a high speed, likewise saves 25 per cent of that power. These savings, together with the advantages in engines and boilers, seem to cause the cost of power $1\frac{1}{2}$ cents, or 0.675d., per lb. of product to be lower than might have been expected from the price of coal and rates of wages. Moreover, if the expectation as to saving of fuel from recent improvements in engines and boilers be realized, the cost of fuel may (other factors remaining the same) be reduced one-half, and therefore the total cost of steam-power becomes 1 cent, or 0.45d. per lb. of product. This reduced cost would probably be less than the average cost of water-power. Reduction of cost.

Lastly, it may be remarked that the power required to drive a mill is usually estimated on the following basis, for print cloth mills: 80 throstle-spindles equal 200 mule-spindles equal 6 looms per 1 horse-power. Horse-power to machinery.

(To be continued.)

* October 31. — The rate would now have returned to that of 1871. — J. P. H. G.

LABOR IN EUROPE.

SILK INDUSTRIES OF LYONS.

The following information in regard to the cost and condition of labor in Lyons was obtained by Mr. Edward Young, Chief of the United States Bureau of Statistics, and will appear in his forthcoming work on "Labor in Europe and America."

The translation from the French, and the valuable explanatory notes were supplied by a practical silk manufacturer, Mr. T. Nelson Dale, Jr., of Paterson, N. J.

ANSWERS TO QUESTIONS CONCERNING THE INDUSTRIES OF LYONS (FRANCE)
SUBMITTED TO THE "CONSEIL DES PRUDHOMMES"* FOR THE SILK INDUSTRY OF LYONS, SEPTEMBER, 1872.

§ I. GREAT INDUSTRIES.

I. *What are the great industries of the department?*

The chief and by far the most important within the jurisdiction of the Council is the silk manufacture with its numerous auxiliaries.

This industry includes, aside from the raising of silk-worms, cocoon-winding, silk-throwing, branches which, with a few exceptions, are prosecuted within the Lyons district:

1st. The dyeing of thrown and spun silk, worsted and cotton yarns, the dyeing and printing of piece-goods, designing and the engraving of rollers for the same.

2d. The weaving of plain and figured goods, taffetas, satins, velvets, foulards, "lampas," † materials for ecclesiastical and upholstery purposes.

3d. The making up ‡ and winding of trams and organzines; warping, beaming, mounting, and starting of looms; § the mak-

* "Council of Selectmen for the Silk Industry:" a committee composed of both employers and operatives, for the amicable settlement of controversies, established by law in 1806, as a Court of Arbitration.

† Rich silks with satin ground and large taffetas figures in relief. The reverse of damask.

‡ Rolling together a number of skeins into a hank, and then knotting it to prevent the silk from getting snarled. This is done both before and after dyeing.

§ Mounting: Passing the warp through reed and harness. Starting: Regulating the number of shots of shuttle per inch of fabric, also the tension of warp, &c., &c., to make the required quality of goods.

ing of headles with or without mails ; * and the stamping of pattern cards.†

4th. The shearing of velvets ; watering, embossing, finishing, and sizing of piece-goods ; and the cleansing of pieces soiled in process of manufacture.

And, finally, operations connected with weaving and embroidering in gold and the manufacture of trimmings, — comprising the drawing of gold, silver, and brass into threads and strips ; the covering of silk and cotton threads with strips of foil ; ornamental trimming, embroidering, the manufacture of bindings, hat-bands, chenille, goods with ravelled edges and fringes, &c.

Tulles ; hosiery and gloves of silk, cotton, and worsted ; plain and figured laces of silk and cotton ; ‡ stocking-knitting and crochet work.

The manufacture of felt, with plush, straw, and cloth hats.

II. *What is the condition of the operatives in these industries ?*

There are two classes of weavers, — master weavers, who own the machinery ; and journeymen weavers, working under the former for half the price paid for the weaving.§

The works ¶ generally contain from one to four looms, rarely more.

The gross earnings of the master vary from 4 to 6 francs (80 cents to \$1.20) ; those of the journeymen from 2 to 3 francs per day (40 to 60 cents).

All extra expenses are defrayed by the master.

Journeymen dyers work by the day or hour according to the custom of the employer, ten hours constituting a working day.

Most of the men earn from 4 to 5 francs (80 cents to \$1) ; a few as much as 5.50 (\$1.10) per day.

In addition to the journeymen, laborers are used for work which does not require special skill. They work 11 hours, and earn from 3 to 4 francs (60 to 80 cents), averaging 3.50 (70 cents).

* Some headles are made merely with a loop for the warp threads, others are provided with small steel or brass rings.

† The design is first made on paper, then the cards for the loom are stamped accordingly.

‡ The silk belongs to the manufacturer. He sends it out from his office to the dyer, winder, weaver, &c., and pays them per weight or length for their labor.

§ These " works " consist simply of a large room of sufficient size to accommodate the looms, and of a small adjoining bedroom and kitchen combined, for the weaver and his family.

¶ I take it there are no worsted tulles or laces as the original seems to imply.

Some of the manipulations before and after the dyeing, such as the undoing and making up of silk,* require female labor, which is paid at the rate of from 2.25 francs (45 cents) to 2.50 (50 cents) per day of 11 hours.

Overtime is paid 50 to 60 centimes (10 to 12 cents) per hour for men, and 30 (16 cents) for women and apprentices.

From these rates a deduction should be made for loss-time.

The moral influence of loss-time is at least as bad as its material result.

Operatives without work live on credit at first, run into debt, become discouraged, are reduced to poverty, and poverty is a bad adviser.

In Lyons two-thirds of the hands employed in dyeing lose on an average 20 days a year, and the other third as much as 40 or 50 days.

Higher wages are paid for the weaving of silk trimmings than gold trimmings; but, owing to the little loss-time made in weaving the latter, the workmen of both trades earn the same in amount, — an average of 3.25 francs (65 cents) per day.

The manufacture of trimmings by hand furnishes occupation to about 400 women and 100 men at the rate of 1.75 francs (35 cents) per day; but this kind of work is gradually being replaced by loom work.

In both of these industries the master weaver, who furnishes the looms, makes a net profit of 1 franc (20 cents) a day per loom.

The earnings of the master metallic-thread makers † at piece-work cannot be readily estimated, — workmen earn about 3.60 francs (72 cents) per day of 11 hours, and women 2.50 (50 cents).

In gold-thread drawing, men earn 3 francs (60 cents), and women 2.25 (45 cents). Masters work under the same conditions as master metallic-thread makers; ten hours constitute a working day.

Embroidering and fancy trimming are done almost exclusively by women; they earn on an average 1.75 francs (35 cents) per day.

Tulle makers on piece-work receive 1½ centimes per 100 threads, ‡

* Organzines and trams come from the spinner (throwster), done up in knotted rolls. The dyer has to undo these, straighten out the skeins, count them, and mark them with variously knotted strings, so as to distinguish the lots. After the dyeing, the silk is made up into rolls again.

† I.e., winding or coiling a narrow thin strip of metal, gold, silver, or brass spirally around a thread or number of threads of cotton or silk, so as entirely to cover up the cotton or silk. The metallic thread thus made is used in the manufacture of military trimmings, &c., &c.

‡ 100 threads one metre long (39 inches).

for plain goods, and at that rate earn, on an average, from 3 to 4 francs (60 to 80 cents) per day.

In the hat manufacture the operatives are generally on piece-work, and earn, — men, 3.25 francs, (65 cents) ; women, 1.37 (28 cents), on an average, loss-time deducted.

III. *Are there a great number of hands employed in these industries? Estimate the number of men, women, and children in each.*

The number of men and women employed in weaving amount to about 115,000 ; 35,000 of whom live in Lyons and vicinity, and the remaining 80,000 inhabit the department of the Rhone and the neighboring departments of the Ain, the Isere, and the Loire, where there are large manufactures of woven goods, as well as many private looms, worked for manufacturers in Lyons.

This number (115,000) is composed of 56,350 men, equal to 49 per cent ; 50,635 women, equal to 44 per cent ; 8,015 children, equal to 7 per cent.

There are two classes of dyers, — color dyers and black dyers, numbering together from 3,500 to 4,000, proportioned as follows : —

Men, 75 per cent ; apprentices, from 13 to 18 years of age, 10 per cent ; women, 15 per cent.

The manufacture of gold and silk trimmings furnishes occupation to about 1,000 men and 500 women. Metallic-thread making to only 100 men and 600 women ; gold-thread drawing, to 150 men and 300 women ; embroidery, to 200 women ; fancy trimming, to 500 women.

There are about 4,000 persons engaged in the manufacture of tulles in Lyons and its suburbs ; viz., 2,500 men (overseers included), 1,000 women, and 500 children.

The number is much larger in the places about Lyons where the tulle embroiderers (women) live.

There are two kinds of hat-makers :

1st. Fullers and finishers (or cleaners ?), numbering about 1,500 men.

2d. Those employed in trimming hats, in pulling out the coarse hairs from the fur, and in cutting the fur from the skin, for making felt, numbering some 800 women.

The winding of thrown and spun silk, worsted and cotton, is done entirely by women operatives, apprentices, and overseers.

One winder should be reckoned for every five weavers, making 23,000 winders for the 115,000 weavers in Lyons.

The overseers (women) earn on an average from 3 to 4 francs per day.

Each "winding shop" contains from one to four winding frames,* which are the property of the overseer alone. The hands are generally engaged by the year, at the rate of from 150 to 250 francs, board, washing, and lodging included.

Warping is done on the same plan. There are about 3,000 warpers, earning on an average from 4 to 5 francs per day. The hands are engaged on the same terms as the winders, with this exception, — that they receive a bonus of 30 francs a year.

IV. What is the general character of the relations existing between employers and operatives?

In the weaving and in the tulle industries, instability is their principal feature. Employers and operatives are entirely independent of each other. They make and close engagements with each other with the greatest facility.

The question of interest is the only ruling one. The workman works for his employer, and the employer pays him for it.

In this, as well as in the other industries within the jurisdiction of the council, the relations between employers and operatives are generally amicable.

Measures calculated to reconcile the different interests have been carried into effect by the efforts of the "council" during the last few years, and have produced the happiest results.

Among gold weavers and trimming makers, differences arising out of the question of salary have created a certain uneasiness in the relations of employer and operatives, especially since 1869. Before that time the situation was more satisfactory.

V. Give an account of the institutions for the improvement of the condition of operatives.

Operative weavers have established, with the consent of the government, a joint-stock company for the manufacture and sale of silk goods.

They have also formed a "protective and industrial society" for the purpose of resisting a reduction of wages, and furnishing the members with information on all matters related to their work.

* These frames are circular and rotary, operated by foot. The operative, remaining seated, causes the portion of the frame which carries the skeins to revolve past her, and regulates each skein in turn.

There are a number of co-operative stores in different parts of the city for the sale of groceries at retail. Some of them have added to their business the sale of bread, charcoal,* and sausage meats. It is desirable that these societies should grow, extend, and multiply themselves, so as to popularize, in their experimental stage, the various kinds of co-operative societies for purposes of production, credit, and consumption.

There is a loan board in Lyons established by government for the purpose of affording relief to master workmen in distress (for want of orders).

Those provided with good recommendations can borrow a sum not exceeding 40 francs (\$8) for each of their looms for plain goods and 50 francs (\$10) for each one for figured goods.

The rate of interest is 5 per cent. If the loan is not returned when due, the company is reimbursed by a retention of wages to the extent of $\frac{1}{2}$.

As regards the dyeing industry, some employers have endeavored to better the condition of the workmen by assisting them by means of voluntary contributions in becoming interested in the "mutual aid societies" and "pension banks," or by giving them, in the way of a premium, a share in the profits of the establishment, or else by providing them with a physician in case of sickness.

The workmen have formed a "mutual society," which is at present in a flourishing condition. Employers are admitted as honorary members. A few journeymen dyers belong to the "mutual loan societies" and "co-operative stores" of the place. In 1868 some journeymen dyers formed themselves into a "co-operative joint-stock company, with a variable amount of capital." 20 men are employed in the works.

The dyers have also established a "protective and industrial society" to oppose a reduction of wages and afford relief to the victims of accidents (members only) and to those who have been rejected by the mutual societies. Members pay 50 centimes (10 cents) a month.

Hatters have five "mutual aid societies" in the department, including the women hat-trimmers society.

In the tulle and trimming industry, there are no such organizations.

* Charcoal is extensively used in France for cooking and heating purposes.

VI. Has there been an increase in wages in the Department?

The question of wages is a vital one, especially in commerce and the more important manufactures. It is one of the most formidable problems of modern society. For several years wages have been gradually and regularly increasing with a corresponding increase in the prices of the various articles manufactured. Thus, the price of velvets has increased 50 to 60 per cent; "patterns,"* figured and fancy goods, 30 to 40 per cent; taffetas and plain goods, 15 to 20 per cent; dyeing (during the last 2 years alone), 10 to 12 per cent.

In the tulles manufacture, the rates of wages remain on an average nearly stationary, following the fluctuations of supply and demand. Men earn 4 francs (80 cents), and women 2.50 (50 cents), and women embroiderers working at home in the country earn from 60½ centimes (12 cents) to 1.50 francs (30 cents).

In the hatters' trade there has been a reduction of 30 per cent in all hand work for which machine work has been substituted. The price of "brushed hats, Flemish style"† has increased 20 per cent.

In gold weaving, &c., the rates have increased 20 per cent, and in the manufacture of trimmings, 17 per cent.

VII. Has there been an increase in the cost of the necessities of life?

Yes, to a remarkable extent. The price of articles of food has risen from 30 to 40 per cent. The price of meat, especially, has increased to such an extent during the last few years as to make the condition of the working classes worse and worse.

VIII. Under what conditions are agricultural and industrial pursuits combined?

The population of the Lyons district is engaged almost exclusively in manufactures; that of the neighboring departments is engaged in both agriculture and manufactures, pursuing them alternately according to the season. Those who are thus employed are weavers, hatters, embroiderers, &c. Their lot is, in general, preferable to that of the city operatives, who receive higher wages, but whose expenses are greater and heavier, who are subject to more "loss-time," and whose occupation is more uncertain.

* Goods in which there is any variety in the play of the threads (as serges), simple designs, but not flowers, figures, &c.

† Hats with a long silk plush.

IX. What is the state of education among the operatives? Do the children attend school?

After considering the material wants of the workman, if you inquire into his real condition, it will have to be acknowledged with regret that, not only is his education very limited, but in some cases entirely neglected. Parents pressed by straitened circumstances only send their children to school up to their twelfth year. The knowledge which they acquire there is very elementary and soon forgotten in the midst of surroundings so unfavorable to its retention and so much more unfavorable to its cultivation.

There are indications of progress in the education of the laboring classes, but there is much wanting. The native Lyonnese can generally read and write. Parents are usually willing to send their children to school, and the attendance is pretty regular; but the number of schools is far from sufficient in many districts of the city, and in some there are none at all. In the trimming industry operatives have about the amount of education necessary for their occupation, and their children generally attend school.

X. Has any society been established within the Department for the purpose of enabling workmen to become owners of real estate? What is the status of these societies, — chartered or independent? What share have employers had in them? What have been the results? What is the number of the "Mutual Aid Societies?"

There is no institution with such an object in view; but manufacturers cheerfully make advances towards the purchase of a loom to any one of their workmen whose work has won their approval. In this way workmen become master-weavers. The loan is refunded by retaining one-eighth of the wages. Ten per cent of the present master-weavers began in this way.

The "mutual aid societies" are very numerous. They embrace nearly all the industries represented in the council. There are many societies of this kind with a large number of participating and honorary members.* Especially worthy of mention is the great weavers' society of Lyons, under the patronage of the Chamber of Commerce. Its members number 5,000; viz., 1,600 men and 3,400 women. The former pay 2 francs (40 cents) a month; the latter 1.50 (30 cents). In case of sickness, the society provides its members gratuitously

* In 1857 there were in France 3,860 of these societies, with a "participating" membership of 460,000. In 1860 the number of the societies had increased to 4,410. Some of them are under government supervision.

with medicines, the attendance of its physician, and a subsidy of 2 francs (40 cents) and 1.50 francs (30 cents) per day for men and women respectively.* An additional charge of six centimes is made on every kilogramme of silk (a trifle over $\frac{1}{2}$ cent a lb.), weighed at the "public silk-conditioning office"† for the benefit of this society. The amount received annually from this source, 100,000 francs (\$20,000), is set aside for the purpose of duplicating the deposits of the members of the society at the "Pension Bank."‡

The trimming makers have a "mutual aid society," to which nearly all the employers belong as honorary members.

XI. *Do joint-stock societies tend to supplant private manufacturing enterprises?*

By no means. Several unfortunate attempts have been made by workmen in that direction, but they seem to have abandoned the idea. There are no such efforts to report on the part of manufacturers.

XII. *Are there any instances within the district of large manufacturing enterprises being conducted by a company or society of workmen?*

There are none, except that of the weavers' society and that formed by a few journeymen dyers, which are still in operation.

§ II. — MINOR INDUSTRIES.

I. *What are the minor industries of the department of any commercial importance?*

In the silk manufacture the minor industries are pasteboard-box

* Some, if not all, of these societies defray also the funeral expenses of members.

† As silk absorbs moisture very readily, its weight varies according to the dampness of the atmosphere. To secure dealers and buyers against losses arising from variations in the weather and from fraudulent moistening, public offices for ascertaining the amount of moisture in silk have been opened in all cities where silk is largely used for manufacturing purposes. A sample of each bale is carefully weighed, then perfectly dried in a heated metallic box, and weighed again. 11 per cent is added to the weight dry, which is considered as representing the amount of moisture absorbed by silk from the atmosphere on an average day of the year. Silk can absorb as much as 33 per cent.

All raw silks pass through these offices. Duly registered and signed certificates of tests are furnished, not only of the amount of dampness, but also of that of gum and foreign substances in raw and thrown silks, and of the average size, strength, elasticity, and of the twist and general nature of silk fibres, all of which may be of consequence to the manufacturer.

‡ An institution under the control of a government commission having for its object the assurance of annuities to the superannuated railroad companies, omnibus lines, and other corporations, sometimes makes deposits in this bank for pensioning off its employés when they become too old to work. The number of policy-holders in 1858 was 10,331, of whom 3,692 were operatives.

making, making packing-cases, headle-making, twisting, and drawing in,* beaming, warping, reeding, pattern-card stamping, the manufacture of Tacquard machines, shuttles, reeds, and other weavers' implements, and the construction of looms.

There are also minor industries connected with dyeing, as the dyeing and cleansing of piece-goods soiled in process of manufacture (and garments). A very moderate investment suffices for a small business which is sustained by local wants. The owner does the work himself, and in busy times employs one or more assistants.

The laundry business should also be mentioned, which is moving from the city to the country. It is becoming quite extensive, and even sustains some large establishments.

II. *Are the minor industries inclined to maintain or extend themselves, or become absorbed by the great ones?*

III. *If they are being absorbed, state the most apparent cause of it.*

They are rather inclined to maintain themselves, because of the cheapness and simplicity of the necessary machinery and implements.

There is no danger of absorption, either at present or in the future.

IV. *Are there any minor manufactures in the department carried on by a company or society of workmen?*

None.

V. *Has there been an increase in the rates of wages in these industries? Have the prices of the necessities of life increased?*

The same answers are given as to questions V. and VI., under the head "Great Industries."

The increase in wages is on an average only from 20 to 30 per cent.

VI. *What is the state of education among the operatives in these industries? Do the children attend school?*

The same answer is given as to Question IX., § 1.

* Twisting and drawing in; i.e., attaching the threads of a new warp, one by one, to the thumbs or ends of a warp which has just been woven out, and then drawing the new warp by means of the thumbs through the harness and reed. In case the harness and reed are used for the first time, the threads have to be passed through both by means of hooks.

Notwithstanding the repetition involved, we republish, as a suitable appendix to the preceding article, the summary published by Mr. Young in the "Independent" of February 5th, 1874:—

The preparation of silk thread dates back to the time of King Louis XI. (1461–1483), who introduced the manufacture of silk into France. The construction of the machines employed at that early period is unknown; but they must have been of the most simple character. In the year 1670, at the request of the municipal council of Lyons, that astute statesman, M. Colbert, finance minister of Louis XIV., sent to Bologna for a millwright named Pierre Benay, who erected near Aubenas an establishment for winding and twisting silk, in which the latest improvements invented in Italy were introduced. It is not known what these improvements were; but it is believed that the machines in use in the latter part of the seventeenth century differed little from those described by writers in the succeeding century.

But little progress was made in the silk manufacture from 1790 to 1824; but after the latter year improvements succeeded each other with great rapidity, each inventor striving to eclipse his predecessor in solving the difficulties attendant upon this important industry.

It is unnecessary to trace the progress of the silk manufacture in Lyons, from its inception, two hundred years ago, until the present day; to follow its migration to Switzerland, England, and quite recently to this country, interesting as such a history would be. Our present purpose is partly to exhibit the extent and variety of the manufactures, but chiefly to consider the number and condition of the work-people of that busy city.

I. THE GREAT INDUSTRIES.

The chief and most important industry of Lyons is the silk manufacture, with its numerous auxiliaries. This includes not only the raising of silkworms, cocoon winding, and silk throwing,—employments which are not prosecuted to any great extent in Lyons,—but the dyeing of thrown and spun silk; the dyeing and printing of piece goods; the designing and engraving of rollers for printing; the making of headles and stamping of pattern cards; the making of trams and organzines; warping, beaming; the mounting and starting of looms; the weaving of plain and figured goods, taffetas, satins, velvets, foul-

ards, "lampas,"* and materials for ecclesiastical and upholstery purposes; the shearing of velvets; watering, embossing, finishing, and sizing of piece-goods; and the cleansing of pieces soiled in process of manufacture; and, finally, operations connected with weaving and embroidering in gold and the manufacture of trimmings (*passementerie*), as well as silk hosiery, and hats of felt, cloth, and silk plush.

II. THE NUMBER OF MEN, WOMEN, AND CHILDREN EMPLOYED IN EACH INDUSTRY.

In weaving the number is about 115,000, of whom 35,000 live in Lyons and vicinity, and the remaining 80,000 in the departments of the Rhone, the Ain, the Isere, and the Loire, where there are large manufactories of woven goods, as well as many private looms operated for the manufacturers of Lyons. Of the 115,000, 56,350, or 49 per cent, are men; 50,635, or 44 per cent, women; and 8,015, or 7 per cent, children.

Of the two classes of dyers — color and black — there are 3,500 to 4,000, of whom 75 per cent are men, 15 per cent women, and 10 per cent apprentices from thirteen to eighteen years of age.

The manufacture of gold and silk trimmings furnishes occupation for about 1,000 men and 500 women; metallic-thread making to 100 men and 600 women; gold-thread drawing to 150 men and 300 women; embroidering to 200, and fancy trimming to 500 women.

In the manufacture of tulles in Lyons and its suburbs about 4,000 are employed, — 2,500 men, including overseers, 1,000 women, and 500 children.

The hat manufacture furnishes employment for 1,500 men and 800 women; the latter chiefly in trimming hats. The winding of thrown and spun silk, worsted, and cotton, is done entirely by women. As one winder is required to every five weavers, employment is furnished to 23,000 winders in and near Lyons. Each "winding shop" contains from one to three winding frames. These frames are circular, having a rotary motion, and are propelled by the foot.

III. THE EARNINGS AND CONDITION OF THE OPERATIVES.

There are two classes of weavers, — master weavers, who own the machines, and journeymen working under them for half the price paid for weaving. The silk belongs to the manufacturer, who sends

* Rich silks with satin grounds and large taffeta figures in relief, — the reverse of damask.

it to the weaver, also to the dyer and winder, and pays per weight or length for the labor of each. The weaving is usually performed in a room of sufficient size to accommodate three or four looms, and adjoins a small room (bedroom and kitchen combined) for the weaver and his family. The gross earnings of the master are from 4 to 6 francs (80 cents to \$1.20), and the journeyman from 2 to 3 francs per day. All extra expenses are defrayed by the master. Journeymen dyers work by the day (of ten hours), and earn from 80 cents to \$1. For work that does not require special skill workmen earn from 60 to 80 cents per day of 11 hours. Females are employed in some of the operations, and earn from 45 to 50 cents per day of 11 hours. For overtime men receive 10 to 12 cents, and women and apprentices 6 cents per hour. From the daily wages a deduction is made for lost time, the moral influence of which is as injurious as the material loss. In Lyons two-thirds of the hands employed in dyeing lose, on an average, 20 days in a year; and the other one-third 40 or 50 days. Operatives without work live on credit at first, become involved in debt, then discouraged, and soon reduced to poverty.

Higher wages are paid for the weaving of silk trimmings than of gold trimmings; but, owing to the little time lost by the latter, the workpeople of both branches earn the same amount, — 65 cents per day. The manufacture of trimmings by hand furnishes occupation to about 100 males and 400 females, who earn 35 cents per day; but this kind of work is being replaced by machinery. In these two industries the master weaver furnishes the looms, for each of which he receives 20 cents per day. In the metallic thread industry men earn about 72 cents per day of 11 hours, and women 50 cents. In gold-thread drawing men earn 60 cents and women 45 cents per day of 10 hours.

Embroidering and fancy trimming are done almost exclusively by women, whose earnings average 35 cents per day. Tulle makers at piece-work receive $1\frac{1}{2}$ centimes per metre (39 inches), and earn from 60 to 80 cents per day. In hat-making operatives are generally employed on piece-work, the men earning on an average 65 and the women 28 cents per day, after deducting lost time.

IV. THE RELATIONS EXISTING BETWEEN EMPLOYERS AND OPERATIVES.

The relations between employers and employed are in general amicable. The "Council of Selectmen" have during the last few years initiated measures to reconcile the differences which frequently

arise between the two parties, and with the happiest results. In the weaving and in the tulle industries employers and operatives are entirely independent of each other, making and terminating engagements as interest may dictate. Some disturbance of the cordial relations which existed between the gold weavers and trimming makers and their employers previous to 1869 has occurred in reference to the earnings of the former.

V. ASSOCIATIONS FOR THE IMPROVEMENT OF THE CONDITION OF THE OPERATIVES.

The operative weavers have established, with the consent of the government, a joint-stock company for the manufacture of silk goods. They have also formed a "protective and industrial society," for the purpose of resisting a reduction of wages, and furnishing the members with information on all matters relating to their work. The dyers have a similar society, in a flourishing condition, which also affords relief to such of its members as have met with accidents, and who have been rejected by mutual societies. Some employers in the dyeing industry, to improve the condition of the workmen, have assisted them by voluntary contributions in becoming members of mutual aid societies and "pension banks," or by giving them a small share of the profits of the establishment, or by providing the services of a physician in case of sickness.

Manufacturers cheerfully make advances toward the purchase of a loom to any of their workmen whose work has won their approval. In this way workmen become master weavers, and it is estimated that one-tenth of the master weavers began in this way.

"Mutual Aid Societies" * are very numerous, embracing honorary as well as participating members. The great weavers' society of Lyons, under the patronage of the Chamber of Commerce, numbers 5,000 members, — 1,600 men and 3,400 women. The former pay 40, and the latter 30 cents per month. In case of sickness, the members obtain gratis medicines and the services of a physician, and an allowance of 40 and 30 cents per day to men and women respectively.

There are a number of co-operative stores in different parts of the city for the sale of groceries at retail. Some of these also sell bread, sausage-meat, and charcoal. A loan company has been established for the purpose of affording relief to master workmen who are in dis-

* In 1860 there were in France 3,860 of these societies, with a participating membership of 460,000. In 1860 the number of societies had increased to 4,410.

tress for want of orders. Those having good recommendations can borrow, at 5 per cent interest, a sum not exceeding 40 francs for each loom employed on plain goods, and 50 francs for each at work on figured goods. If the loan is not paid at maturity, the company is entitled to receive one-eighth of the earnings of the weaver. Some journeymen dyers have formed themselves into a co-operative joint-stock company, which employs 20 men. The hatters have four and the female hat trimmers one mutual aid society.

VI. INCREASE OF WAGES.

For several years there has been a gradual increase in wages, with a corresponding increase in the prices of manufactured goods. For example, velvets have advanced from 50 to 60 per cent; figured and fancy goods from 30 to 40; taffetas and plain goods from 15 to 20; and dyeing, during the past two years, from 10 to 12 per cent. The average rates of wages in these industries are as follows: Men, 80 cents; women, 50 cents; while embroiderers, working at their homes in the country, earn from 12 to 30 cents per day.

In the hatter's trade there has been a reduction of 30 per cent in such handwork as has been cheapened by machine work. The price of silk-plush hats, Flemish style, has increased 20 per cent. In gold weaving the rates have advanced 20, and in the manufacture of trimmings 17 per cent.

VII. INCREASE IN THE COST OF THE NECESSARIES OF LIFE.

All articles of food have increased in price from 30 to 40 per cent, while meat has risen to such an extent in the last few years as to almost place it beyond the reach of the working classes.

VIII. COST AND KIND OF LIVING.

A single man can obtain good board for \$2, and lodging for 75 cents per week. A family of two adults and one child of about fourteen years, earning about \$10 per week, may live comparatively well on an expenditure of \$4 for food, while \$1.50 will pay for rent of two bedrooms, a kitchen, and a room for their looms. This class of people live principally on soup, cooked with vegetables, meat, bread and light red wine. The latter article, costing from 24 to 40 cents a gallon, is used by everybody, forming an essential portion of the daily food. Coffee is comparatively neglected, and replaced by a very thick

and substantial broth. Tea is used only in case of sickness. Of bread only white is used. Of meats, fresh beef and mutton have the preference; occasionally smoked ham and sausages come in by way of variety. Frenchmen, as well as women, are perfect cooks, and understand how to prepare, with the above principal ingredients, most excellent and healthful dishes.

IX. EDUCATION.

The education of the workmen is very limited, and in some cases has been entirely neglected. Parents in straitened circumstances only send their children to school up to their twelfth year, and the knowledge thus acquired is very elementary, and soon forgotten amidst surroundings so unfavorable to its retention and much more so to its cultivation. The native Lyonnese can usually read and write, and parents are generally willing to send their children to school; but the number of schools is insufficient in many districts, while in some there are none at all.

Industrial Miscellany.

MR. FERNAU ON THE AMERICAN WOOL MANUFACTURE.

THE records of the current literature of the woollen industry, which it is one object of this journal to supply, would be incomplete without the publication of the following letter of an eminent foreign worker in the wool industry, Mr. George Fernau of Belgium. We do not publish this letter as a novelty to many of our readers, who already have it in the form of a lithographed circular, in which it was distributed, but that it may be in a more accessible form for future reference.

It was our intention to comment at length upon this interesting letter. But an extended notice is prohibited at present by want of space, while our views as to the policy of protecting the American sheep husbandry, in which we differ from Mr. Fernau, have already been explained in the first article in this number. Moreover, the

letter of Mr. Fernau is written in so fair and candid a spirit, with such hearty sympathy with the American manufacturer, and contains so much truth with its few errors, that we feel indisposed to criticise him unkindly. It is due to him to say that no foreign manufacturer has shown himself so ready to communicate to Americans information in relation to European improvements in processes and machinery.

This letter is worthy of the special attention of wool-growers and legislators, as it furnishes testimony from an unprejudiced source as to the exceedingly moderate protection afforded by the present tariff to the American wool manufacture. It is in striking contrast to Mr. Wells's assertion that our woollens are protected by "a duty of from 50 to 150 per cent." It conclusively disposes of the reproaches of selfishness and monopoly which have been so ignorantly or maliciously heaped upon the manufacturers who assisted in framing the present legislation.

The remarks of Mr. Fernau as to the adaptability of our merino fleeces for combing purposes are peculiarly interesting to us, since nearly nine years ago we made the statement that "this country will never know the inestimable treasure which it has in its fleeces until American manufacturers appropriate them for combing purposes." Our worsted manufacture is not yet enough developed to make this appropriation, and in the mean time the American wools are sufficiently adapted to the present wants of the majority of the card-wool manufacturers. Comparatively few of our manufacturers will agree with Mr. Fernau in the desirableness of substituting for them the short and weak mestiza wools. Signal instances will occur to our manufacturing readers of losses within the last year from attempts to make this substitution. Mr. Fernau remarks, perhaps with justice, upon the want of proper *feel* in cloths made of American wools. For the majority of American cloths, which are made up in our large clothing-houses, this is a slight defect when counterbalanced by the superior soundness and strength given by our wools, and demanded for popular consumption. But other fabrics than finished cloths are required for consumption. The admitted superiority of our flannels is due to the spinning qualities of American wools. In another manufacture in which we have attained great excellence, that of blankets, the wool of the American merino is an essential raw material. The statement has been recently published that blankets made at Minneapolis, Minnesota, are exported to England to furnish the new lines of palace

sleeping-cars. Specimens of this manufacture were sent to us by the makers, Messrs. Gibson and Tyler, of such marvellous beauty that we were constrained to request these gentlemen to inform us as to the source of the raw material, who replied to us as follows : —

“The best wool we can get for our fine blankets is the American merino. We have tried a variety of foreign wool, but as yet have succeeded in finding none that will produce as *white* and in all respects as elegant blankets as we make from the merino fleece of the North-west. We manufacture annually about seventy thousand pairs of blankets, the most of which are made from wool produced in our own State. The sheep of Minnesota are remarkable for their vigor and freedom from disease, and as a result we are sure to get strong, even wool. This State is very young, and the production of wheat is at present the all-absorbing subject with our farmers ; but our wheat-fields are sure, under the present system of cultivation, to become impoverished, and sheep will, in time, figure an important part in the redemption of these lands.

“The capabilities of the West and North-west for the production of wool can hardly be over-estimated. If wise laws prevail, the day is not far distant when we shall not be compelled to buy a pound of wool in any foreign market, and when we shall lead the world in the production of all kinds of woollen fabrics.

“Our Western tailors returning from the East this spring admit for the first time that American cassimeres surpass in beauty and workmanship those made in foreign countries. This is certainly very gratifying, and foreshadows the great success of the woollen industry.”

No language of ours could so well express the sentiments, not only of the wool-growers, but the wool manufacturers of the West, — the seat of legislative power in this country, — as to a policy which differs from the whole tenor of Mr. Fernau's letter. It is natural that a foreigner, familiar with governmental systems which regard agriculture as subordinate to commerce and manufactures, should suppose that American manufacturers could dictate the wool duties which would be most acceptable to them. He overlooks the fact that our national legislation is controlled, not by manufacturing, but agricultural interests, and that a compromise between these interests is the only condition of legislation upon questions affecting both. Mr. Fernau naturally does not perceive the important part which the wool duties play in our system of industrial economy, that the wool tariff

is in fact the key to our whole protective system, and that the removal of adequately protective wool duties would cause a break in the dam through which the whole tide of free-trade importations would flow in a destructive flood upon the land. He forgets, too, that intelligent manufacturers in this country are accustomed to take broader and more national views than prevail abroad. They regard the establishment of a national sheep husbandry in this country as the foundation of a permanently successful wool manufacture. They would rejoice in lower duties on wool; for, with all the counterbalancing arrangements of the present tariff, the larger capital required to carry the high wool duties is a heavy burden upon the manufacturer. Still, conceding that the preservation of our domestic wool production is of the first necessity, they must allow the wool-growers to determine what protective duties are necessary to preserve their own production. It is to them, and not to us, that Mr. Fernau's letter should be addressed; and we reproduce his letter principally with the view that whatever of truth there is in it may shed its light upon the minds of the many intelligent wool-growers who read our journal.

BRUGES, 27th November, 1878.

MY DEAR SIR,—In the letter of my firm of 17th inst., I promised to give my impressions as to the position of the woollen industry in the United States, and I now comply with this engagement.

When the now existing duties on woollens and wool came into operation in the Union, it was expected by the framers of the law and by the manufacturers that sheep-farming would acquire a considerable impulse, and in a few years would produce a sufficient quantity of wool to meet the requirements of native industry, at prices that would render the importation of both wool and woollen fabrics impracticable, so that the native mill-owners should supply all the wants of the people to the exclusion of their transatlantic competitors.

Unfortunately for this patriotic design, the average climate and the peculiarities of the American soil hitherto husbanded (California is excluded in this estimation, and I omit mentioning such States as Virginia, Tennessee, Texas, &c., where sheep husbandry might prosper greatly), and the preference that was to be expected would be given by an industrious and energetic race to corn and cotton-growing over sheep-farming had been overlooked, and all the previous calculations are baffled by actual events. It so happens, indeed, that the number of sheep, instead of augmenting, has been gradually diminishing; that the production of wool is very inferior to the wants of the existing mills; and that the deficiency must be supplied by foreign importations. Thus the sheep-farmer has it all his own way: the demand being greater than the supply, he commands the market; and in the price he asks and obtains he is only checked by the price at which foreign wool can be imported. This state of things is not a transitory

one. It is not likely to alter, as America is not as yet, nor seems to be destined to become, a sheep-growing country, in the sense that this is understood in Australia, the Cape, or the River Platte. Sheep-farming does not pay; and, in my opinion it is high time for the manufacturers to open their eyes, and to try to find a remedy for an evil which ultimately will cause their ruin.

Wool then cannot be procured by the manufacturers at home at a lower price than foreign importations. As to these, present prices may be considered as normal ones, as they only represent the cost of production, with the addition of a scanty profit for the farmer; but should they, contrary to all expectations, be obtainable abroad at a large reduction, here again the American manufacturer derives scarcely any advantage from the fall, as the import duty is mainly established on the weight, and not "*ad valorem*;" the effect being that the imported wool, whatever its primitive cost, will always stand at a high figure, duty-paid, and that the price of the native raw material will be but little affected by such decline.

Admitting for *short* card-wools (which ultimately will be employed in the United States in preference to long wools, the same as they are in Europe) a low cost price of 18 cents gold, and a shrinkage of 65% on an average, the scoured wool, after adding 11 cents for duty, will cost 88 cents gold per lb., and, judging from past experience, it is not to be expected that domestic wool, except Californian, will ever fall beyond said figure.

On the other hand, the duty on imported woollens is for the European maker *only* equivalent to the higher price which the American manufacturer must pay for the raw material, taking into consideration the disadvantages under which the latter labors in the cost of production. It is thus evident that the American manufacturer, in order to prosper and maintain his ground against foreign competition, must work as well, have the same skill and taste, have at hand the same supply and variety of wools for different fabrics, so as to satisfy the ever-changing fashions, be enabled to turn to advantage all wastes and refuses which now, skilfully mixed, play such an important part in lowering the cost of fabrics, and, before all, turn the current of prejudice of the consumer himself, who as yet to a large extent is inclined to give the preference to foreign importation, at higher prices than he will pay for the fabrics of his countrymen. Whatever strides the Americans have made in the woollen industry, — strides of which they have the right to boast, — there is no denying that on equal terms with foreigners in the power and price of production the latter will have the preponderance; and no wonder that foreign imports, instead of gradually diminishing and even disappearing, as was contemplated, should have increased lately as largely as they are likely to increase in future under similar circumstances.

All then has turned against the American manufacturer, — stagnation, if not actual diminution, of domestic wool to supply his mills; augmentation, instead of diminution, of the price of the same; larger imports of woollens in competition with his own; and inability, thanks to the tariff, to profit, except a trifle, by any fall in foreign wools, — a fall of which the foreign maker only and at once derives the advantage.

In order to prove the correctness of my assertion that the American manufacturer cannot produce cheaper fabrics (I will only mention fancy clothing, which bears more directly on my theme) than foreign importation, I shall give

a comparative calculation on a reduced scale, based on a mill that works 1200 lbs. of scoured wool daily, and occupies 230 men, 300 women, and 50 children.

Europe.

5000 lbs. of scoured mestiza wool, manufactured in Belgium, Germany, or France, and converted into fancy clothing (*nouveautés*), will cost, at present rates Gold \$4742.10

This sum being subdivided as follows:—

1. Interest, and tear and wear of capital engaged:		
5% interest on value of the ground	} Dollars Gold.	Per cent.
10% interest, and tear and wear of buildings		
15% interest, and tear and wear of machinery		
2. Raw material:		
5000 lbs. of scoured wool, at 55 cents	2750.00	57.99
3. Ingredients of all kinds	281.90	5.95
4. Heating, lighting, and moving powers	171.00	3.61
5. Wages (\$0.60 a man, \$0.80 a woman, and \$0.20 a child)	1020.20	21.51
6. Taxes, insurance, and sundries	122.60	2.58
	<u>\$4742.10</u>	<u>100.00</u>

These 5000 lbs. of scoured wool will produce approximately 8225 yards of fancy clothing. If now a loss in manufacturing is admitted of 10%, the original weight will represent 4500 lbs., of a value of

$$\frac{\$4742.10}{4500 \text{ lbs.}} = \text{Gold } \$1.05 \text{ per lb.}$$

And the weight will be:

$$\frac{4500 \text{ lbs.}}{8225 \text{ yds.}} = 1.39 \text{ lbs. per yard.}$$

These goods introduced in the United States would cost:

		Per lb.	Per yard.
First cost		Gold \$1.05	Gold \$1.46
Duty 74½% *			
Freight, insurance, commission, <i>delcredere</i> , loss of interest, &c., 11½%			
Profit 5%			
		<u>0.95</u>	<u>1.33</u>
		Gold \$2.00	Gold \$2.79
* Duty	Per lb., \$0.50		
	<u>\$1.05</u> 35%	<u>0.87</u>	
		<u>\$0.87</u>	
\$1.05 : \$0.87 :: 100	= 82.86%		
Less 10%	= 8.29%		
	<u>\$74.57%</u>		

United States.

5000 lbs. of scoured mestiza wool, manufactured in the New England States, and converted into fancy clothing (*nouveautés*), will cost, at present rates, with 5% profit Gold \$8927.00

This sum being subdivided as follows:—

1. Interest, and tear and wear of capital engaged :		
10% interest on value of the ground	} Dollars Gold.	Per cent.
15% interest, and tear and wear of buildings		
20% interest, and tear and wear of machinery		
2. Raw material :		
5000 lbs. of scoured wool, at 85 cents	4250.00	58.80
3. Ingredients of all kinds	850.00	4.48
4. Heating, lighting, and moving powers	200.00	2.58
5. Wages (\$1.75 a man, \$0.75 a woman, and \$0.50 a child)	2000.00	25.82
6. Sundries	300.00	3.80
	\$7900.00	100.00
Sale expenses 8%		
Profit 5%		
	18%	1027.00
		\$8927.00

Thus establishing a cost price, with profit of

Per lb., gold.	Per yard, gold.
\$8927.00	\$8927.00 × 1.39
4500 lbs.	4500 lbs.
\$1.98	\$2.75

If these calculations are correct, as I think they are, there seems to be no doubt that the law which was intended to favor the American manufacturer has in practice not afforded him any protection whatever, and that it would be but justice and sound policy that the legislature should at once lower the duty on raw material to such a point that native industry may be enabled to compete with Europeans.

But all my foregoing remarks only apply to card wools and the fabrics made therefrom. I must establish a distinction for worsteds, as this industry in the United States is likely to prosper in a general way, for reasons opposed to those which make me believe that clothing woollens are under circumstances too adverse to sustain a successful struggle. Combing-wool, indeed, is procurable in the Union at a figure which leaves a fair margin on foreign imported goods, as similar wools in Europe or in the countries of production are at far higher rates than carding ones. And here it is opportune to say that as most of American wools are appropriate to combing purposes; not in the way as combing, by means of very long wools, is understood in America, but as it is understood in the North of France, where, thanks to the great perfection to which machinery is brought for the finer grades, wools of two inches and even less are easily

worked; here it is opportune to say, I repeat, that the effect of the revision of the tariff in the United States, in lowering the import duty on raw material, would unavoidably be this: three-quarters of the American wool would, in the course of time, be advantageously employed for worsted purposes, by the introduction of proper machinery, thus causing no prejudice to sheep-farmers, for a figure nearly as high as the current one could then be paid for an article which, being fit for *combing*, is, contrary to all present principles in the woollen industry, employed for carding, and the cloth-mills would get their supply from foreign importations, and from all card-wools (such as are in the bulk of Californian) that the Union produces.

In such a revolution lies, in my opinion, the secret of the future prosperity of the woollen industry in the United States; and such is the general line of policy I shall recommend to our mutual American friends. I have had occasion to see in some dry-goods stores the clothing-woollens now generally made in the Union. They are, indeed, admirably worked. It is almost impossible to distinguish them from foreign goods; but in one very essential point they differ completely, and this is the *feel*. I had thought then that this harshness was connected in some way with imperfection in scouring the wool or making the stuff, but now I have come to a different conclusion. The *feel* is hard because the wool is not right. To make a good face the Saxon fleece is required, — a short staple, the shorter the better: such wool felts better, and makes a better article.

Many old manufacturers will not agree with me on this point. They will stick to the old-fashioned, strong-bodied, long-stapled wools: but what results do they obtain? Besides paying 20 to 30% more for the raw material, they make goods inferior in appearance to those made with mestiza wool, and that do not certainly fetch a higher price. Manufacturers that employ the River Platte and other short staples will bear me out in the opinion that I am right. My decided opinion then is, that American wools will ultimately be employed for the combing purposes to which they are naturally adapted, and that the clothing-mills, after the revision of the tariff, will have to work the Saxon wool produce.

FRAUD IN COTTON MANUFACTURE.

PHILADELPHIA, April 10, 1874.

DEAR SIR, — Read the enclosed article cut for you from the "Tribune" in the hope that it might be preserved in the pages of your excellent journal.

It would be difficult anywhere to find more conclusive evidence of the deleterious influence of the British system — miscalled free trade — on the moral feeling of the community by which it is maintained. Week after week, month after month, we have advices of the movements of societies having for their object the Christianization of the people of heathen lands; and yet, for every dollar so expended, they are being robbed of thousands by means of frauds such as are here exposed. Cotton being supplied that cannot stand even a single washing; railroad bars made of cinder iron; iron ships through whose bottoms bars can readily be driven; and guns which explode on the first attempt at firing them.

Saddest among all the facts now presented for consideration is, to me, that exhibited by our clergymen in their determination not to see that a fundamental gospel may be found in the first chapter of Genesis, and is that known as the "blessed gospel of work." That men may become good husbands, good fathers, and useful citizens, it is indispensable that they be enabled to combine with their fellow-men for making their joint labors more productive. That they may so combine, it is needed that there be that diversification of employments which it is the object of protection to secure, and of British free trade to prevent; and yet it would be difficult to find even a single occupant of a pulpit who recognizes the fact that in teaching protection he would be teaching Christianity.

Excuse me for troubling you with all this, already so well known to yourself, and believe me with great regard,

Yours very truly,

HENRY C. CAREY.

J. L. HAYES, Esq.

P. S. A capital letter on this question is from my old friend Webb, was published a short time since, and I should be very glad to see it also preserved in your pages, as it so well deserves to be.

ENGLISH DRILLS FOR EXPORT WEIGHTED WITH SIZE. — SHANGHAI MERCHANTS PROTEST. — COMPARATIVE EXCELLENCE OF AMERICAN CLOTH.

Messrs. A. A. Low & Bros., New York.

GENTLEMEN, — Your firm having been for many years one of the largest exporters of American drills to China, and ours being a representative of some of the leading cotton mills of the United States, we have a mutual interest in investigating the causes which have occasioned a decline in this trade since our war. We beg your reference to the inclosed statistics and extracts from official documents, which deserve a wide circulation, and which, if properly understood by dealers and consumers, would have an important bearing upon the export trade, which now shows evident signs of revival.

We find in the "China Overland Trade Report" of Dec. 11, 1873, an official statement of proceedings of the Shanghai Chamber of Commerce, of which the following extract is a part: —

"MANCHESTER, Eng., August, 1873.

"Drills, during the past two or three years, have been sent out to China very much weighted, but at the present moment still more weight is being added to the goods, which bear the same stamp and marks which originally obtained a name for really genuine cloth. No doubt the fraud will some day be detected by the Chinese, as it has been in India.

"The following is the result of washing out the size, &c., from drills:—

Weight in Gray.	Weight Washed.	Loss.	Loss per cent.
15 lb	9 lb 10 oz.	5 lb 6 oz.	or 36.83
14 lb 14 oz.	9 lb 6 oz.	5 lb 8 oz.	or 36.87
14 lb 4 oz.	8 lb 12 oz.	5 lb 8 oz.	or 38.60
15 lb 10 oz.	9 lb 9 oz.	6 lb 1 oz.	or 38.80
15 lb 2 oz.	9 lb 5 oz.	5 lb 13 oz.	or 38.84
15 lb	12 lb 2 oz.	2 lb 14 oz.	or 19.17

Or an average of loss of 34½ per cent.

"*Shirtings.*—A similar fraud is practised on these goods, cloths weighing 7½ pounds being weighted to the extent of 3 pounds, in order to sell them at 10½ pounds. There are large quantities of these in course of preparation for foreign markets.

"The above extracts, we think, throw very much light on the subject.

"Sample pieces of the goods referred to are in the Glenlyon (now overdue), and we shall be pleased to show them to any member of the Chamber.

"We would suggest that, in order to check the importation of such cloths, merchants might endeavor to establish a system of selling plain cotton goods from washed musters.

"[The percentages of loss in the preceding tables are our own figures.]"

The same authority gives a report of the debate of the Chamber of Commerce of Shanghai, and the experience of merchants, members of that Chamber, confirming the above tables.

We have caused to be washed 25 pieces of Boott, Massachusetts, and Suffolk Standard brown drills, all well-known brands in China, with this result, viz.: Weight of 40-yard pieces in brown as put up for export, 14 pounds; weight of same after washing, 13½ to 13¼ pounds; percentage of loss by washing, 3¼ to 5 per cent.

A comparison of the above statistics, taking English drills, per invoices of January, 1874 (the sterling price reduced to its equivalent in American gold), and American drills (the currency price reduced to gold at 12½ per cent premium), shows the following result: If the English manufacturer made his drills, as the American, with only 3½ to 5 per cent (say 5 per cent) sizing, it would increase the price per yard in gold to 11½¢, while the price of the American drill on the same basis is 9½¢, — difference in favor of the American drill, 1½¢.

Or again: If the American manufacturer should degrade his standard to the English, using 34½ per cent sizing, the American price would be, per yard, gold 6½¢, while the English price on same basis is 7½¢, — difference in favor of the American drill, 1½¢. It will also be conceded that the grade of cotton used in the American standard drill is much higher than in the English.

Your obedient servants,

GEO. C. RICHARDSON & Co.

NEW YORK, April 1, 1874.

AN OLD EDITOR'S VIEWS.—LETTER FROM HON. JAMES
WATSON WEBB.

THE PANIC AND THE NATIONAL FINANCES. — PROTECTION V. FREE-TRADE.

To the Editor of the "New York Times":—

I BEG to submit for publication extracts from a letter received from an old and esteemed friend and a veteran editor of the press, Mr. J. Watson Webb. His views are so thoroughly national on the great questions of territorial acquisition and government, and also on measures of finance, that they will not less interest his old political friends than instruct the generation who are now conducting our public affairs.

C.

VILLA LIONS, NICE, FRANCE, Dec. 31, 1873.

MY DEAR FRIEND, — Time, which spares none, has left you to be numbered among my oldest and most esteemed friends; and, be assured that nothing but illness, followed by a degree of debility I have never before experienced, has caused such delay in answering your friendly letter of the 17th of November.

The late panic will have done no harm, nationally, but much good, if you do not permit it to break down our tariff, which I hold is absolutely necessary for our agricultural interest, while it operates only indirectly for the benefit of the manufacturers. Our home market is the only thing that gives prosperity to the farmers, and it is produced by withdrawing millions of our people from the soil to be fed in manufactories. Return those people to the soil, and make them producers instead of consumers, and you make us a nation of paupers. I have no desire to see any competition with the pauper labor of Europe; and hence I have always advocated the very next thing to a prohibitory tariff. Gold has no earthly value, save as the medium of exchange between nations. To talk of its intrinsic value is to talk nonsense. It will not make a rail, or a plough, or a scythe, and is utterly useless in the fabric of cooking utensils. Its intrinsic value, if any, consists in its usefulness in the manufacture of rings, ladies' chains, lockets, and other gewgaws; while its actual value and its duties for more than 2,000 years have been and are to make up between nations their differences in trade. It is not merchandise, and it is because we have been in the habit of buying and selling it as such at public auction that we have recently so severely suffered, and if the

debtor nation must always send abroad its gold to pay the balance against it, or substitute a paper indebtedness to be ultimately redeemed in gold, does it not follow that no nation can resume and continue to redeem its currency in gold, so long as its imports exceed its exports? We, thank God! through our tariff, have brought our imports to a point where they are fully paid for by our exports; and, if we can, by preserving our tariff, continue to be a creditor instead of a debtor nation, there can be no doubt but gold will be of the same, and very frequently of less, value than paper. No resumption will be necessary. Paper will be in demand, because it is more convenient and less expensive to handle than gold, just as soon as it becomes an established and received fact that paper represents gold. To produce such a result, no legislation whatever is necessary, unless it be to increase our tariff on manufactures, which are the products of pauper labor, and against which our free, intelligent, and well-paid labor cannot contend. Do not think to reduce the price of that labor. Give the laborer the wherewith to pay the farmer liberally for his products, and then agriculture, the basis of all national prosperity, will flourish, and, of necessity, the country itself will continue to be prosperous and great. I hear you exclaiming, — What does all this mean? It means that for eight or ten years past the English press, and the paid agents of England connected with our press, have been laboring more zealously than ever to convert our people to free-trade notions. England's existence depends upon our market: a non-intercourse with the United States, totally excluding English fabrics, would produce such general distress as to render revolution almost inevitable. Her wise men know this, and hence the absurd argument, constantly put forth, that our tariff tends to retard the progress of our country; and this ridiculous argument finds favor with people on our side of the Atlantic; but fortunately, as a rule, these men belong to and constitute a class with one idea only, — men who are unwilling or unable to look at any subject in all its bearings, and who have never cultivated the habit of thinking for themselves. Only yesterday one of the English toadies sent me a "London Times" containing an article explaining the causes of our late monetary crisis. I knew before reading it I should be told that our tariff was the cause of all the mischief, and that I should find, rehashed up for effect, all the arguments so piteously put forth during the last three years, begging and berating France and the United States not to exclude English manufactures, and thus bring distress upon her toiling millions. And

so it was. We are generally told that it is a settled matter, — a fact that admits of no doubt, — that all our trouble arises from our tariff, and that if we will only resort to free-trade, and permit England to send us a few hundred millions of her fabrics in addition to what she now sends, all would be well with us. The cool impudence of this advice is something wonderful. Our tariff is gradually working out the results predicted. It is supplying our wants by the labor of our own workshops, the inmates of which are consumers of what the farmer produces; and consequently the farmer gets better prices for his labor, while our imports are decreased, and we become a creditor instead of a debtor nation, and receive from abroad, in gold, the balance in our favor, instead of sending forth our gold to make up the balance against us. England and her agents never tire in their efforts to seduce us into free-trade. Failing in the present and past generations, they are now addressing themselves sedulously to those who are to be our successors. In this work, as in every thing else connected with this question, their newspaper published in New York, called the "Nation," is the immediate channel through which they address their specious arguments to the rising generation; and I have now laying before me a circular from the "Nation," addressed to a youth in one of our colleges, and by him forwarded to me, in which their new plan of proceeding is fully disclosed. Is not this fact calculated to arouse our people from their apathy, and to incite in the guardians of the country's prosperity renewed efforts to maintain the great principle of protection to home industry, upon which that prosperity is based?

Look well to your metropolitan press. It gives tone more or less to the press of the country; and if you would return to specie payments, take care that the tariff convictions of the people be not disturbed. Keep before them the experience of the past, and the disastrous consequences of the compromise of 1832. To save the Union and put down nullification, Mr. Clay consented to that compromise, and an annual reduction of a certain percentage of the duties imposed by the tariff of 1828; and what were the consequences? We had at the time fifty-eight blast furnaces in operation, and in a few years fifty-seven of them were closed by introduction of English iron, the product of the then pauper labor of Great Britain. Our factories and our workshops were nearly all closed, and their inmates sent back to the soil to become producers instead of consumers of our cereals. Overpro-

duction, without any home market, necessarily followed, and wheat in the West sold at prices which barely paid for the reaping, as the genius of McCormick had not then perfected the reaper. Universal ruin stalked through the land; and the people, with one accord, demanded an immediate return to the great principle of protection to home industry. A generation has passed away since then, and with them too many of the lessons taught by sad experience. Let our people be reminded of what was and what has been, and they will close their ears to the siren voice of the charmer, which, now again, would seduce them into the theoretical and imaginary beauties of free-trade. Above all, let them clearly understand the advantages of a home over a foreign market, growing out of the fact that the home market abstracts laborers from the soil and makes them consumers instead of producers, and thus lessens production and secures higher prices to the farmers.

One fact in relation to the extent and value of our home market is worth volumes of free-trade theories in regard to a more extended foreign market, at starvation prices, to the American farmers. We have always been large exporters of grain and flour since the war of 1812; and yet up to 1847, the year of famine in Ireland, the five New England States wherein most of our manufactories and workshops were situated, took annually from our grain-growing States more barrels of flour and more bushels of wheat than in any one year the United States exported to the whole world. Where we had then one thousand we have now more than ten thousand consumers of produce in our workshops and factories; and their millions free-trade would send back to the soil to become producers instead of consumers. What we want is stability in legislation, and such protection to American industry as will make us a creditor instead of a debtor nation, and create and preserve to us our home market. This we now have, and the very natural result is that last year our exports exceeded our imports. Of course, instead of sending our gold abroad to make up a deficiency in exports, we are to be the recipients of gold in payment of the excess of our exports over our imports. Let this state of things continue, and we require no legislation to enable us to return to specie payments. The difference of trade in our favor will be greater next year than it was the last. That difference has to be made up by retaining among us all the gold we produce, and by receiving a large amount from abroad, and gradually there will be no premium on gold, but, on the contrary, a small premium on paper, to

make payments between distant parts of the country; and thus the problem of specie payments will be solved by simply letting well enough alone.

But the Treasury wants money, because we foolishly insisted upon a too rapid reduction of our national debt, and too hastily reduced our duties on imports. Legislation must remedy this. Let the law which reduced our duties on imports ten per cent, with no other effect than to put so much money into the pockets of foreign manufacturers, without reducing prices to our people one farthing, be promptly repealed; and let other duties and taxes be restored, until the wants of the Treasury are supplied. This done, let our shipping and ship-building interests be at once cared for. Let every dollar of duties collected, or the material used in building a vessel, be restored to the builder, and, in addition, in order to induce him to use American instead of foreign iron, give him, in the shape of a *bounty*, the full amount of duties which would have been restored to him if he had constructed his vessel of foreign instead of American iron.

There, I have written you with an aching head more than I have been able to write at any one sitting in three years, and all because of the consummate impudence of the "London Times" in attributing our late monetary crisis to our tariff, and because I think I discover in the American press and people, through forgetfulness of the past, a yielding to foreign counsels through the seductive voice of free-trade. It is only at such times that I regret my severance from the press, after thirty-five years of labor as the sole and only responsible editor of the "Courier and Enquirer." During that long period I was doubtless very frequently in error, but I always believed in what I preached; and it was the conviction of this fact on the part of our readers that made the "Courier and Enquirer" a prize, and its editor a target to be fired at. I have passed my three-score years and ten, and for thirteen years I have been a mere observer of the press and its progress; and yet when I perceive our people called upon to forget the past, and stultify history and experience, I cannot but wish that I was at my old work. I shall, God willing, be home next year, and then, if not too feeble to work, be assured of my readiness to labor *con amore* in this all-important cause, which more than all others involves the future greatness and prosperity of our country. . . .

J. WATSON WEBB.

TEXTILE TECHNOLOGY.

WE omit in the present number our usual miscellany under this head, with the view of devoting in our next number a larger space than we have yet occupied to this important subject, for which our materials are already too ample to be crowded into the pages now at our command.

PROF. GOLDWIN SMITH'S ADVICE TO CANADIANS.

It is interesting to observe that the most intelligent Englishmen who take up their abode with us and identify themselves with our institutions, if not engaged in trade, become converts to our protective system. As an illustration, we quote some remarks of Prof. Goldwin Smith, addressed, in a letter to the "Montreal Witness," to the Canadians, who are now agitating the protective question. He says:—

"We already have in Quebec a surplus population which is constantly emigrating to the States. This population, though apparently not equal to the Anglo-Saxon in farming, is of a race remarkable for textile aptitude, for taste in manufactures, and for ready submission to factory organization. If, by according to our native manufactures the encouragement of a moderate amount of protection, we could induce our French peasantry to remain at home, and to enrich their own country by the produce of their labor, is it certain that we should not be doing that which political economy as the science of enlightened self-interest enjoins? Might not all owners of property and all producers in Canada be speedily indemnified for a slight temporary sacrifice by a great increase of the prosperity of the country? In adopting such a policy we should, perhaps, be deviating from the general rule which bids us buy in the cheapest market, but should we not be conforming to the higher rule which bids us prefer the greater gain to the less?"

THE PRESIDENT.

THE "Industrial Bulletin," of Johnstown, that admirable organ of the Industrial League of Pennsylvania, thus speaks of President Grant: "The delegation of manufacturers who visited Washington to urge the repeal of the ten per cent reduction of duties made by the act of 1872 called upon the President, who assured them of his entire sympathy with their purposes, and of his readiness to co-operate with Congress in any measure which would restore employment to labor, and renew the prosperity of the country. The President has always shown himself to be in favor of protection to home industry."

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ELLERTON FLANNELS, of all grades.

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PLAIN AND TWILLED SILESAS, ROLLED JACONETS,
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EVERETT MILLS. Cottonades, Light and Heavy Weights; Tickings, Denims, and Stripes; Jeans, Brown, Bleached, and Colored; Shirting Flannels, Ginghams, Dress Goods in great variety.

BOOTT COTTON MILLS. Cottons, Fine, Brown, and Bleached; Drillings, Standard Brown, Blue and Bleached; Standard Boott FF; Boott M Family Cotton.

YORK MANUFACTURING CO. Cottonades, Light and Heavy; Ticks, Denims, and Stripes; York Nankins, Plain, Twilled, and Checks; Dress Goods in great variety of styles.

LAWRENCE MANUFACTURING CO. Cottons, Heavy, Medium, and Fine, Brown and Bleached; Lawrence LL's.

LEWISTON MILLS. Cottonades, O. K's, L, GL, SL, and PL; Bags, Lewiston A, Casco LM, and Union A's; Tickings, 80, 82, 86-inch and Plaid; 2 TF Twine; Brown Denims, Shirting, Stripes A and B Shirting Checks, and Heavy Osnaburghs.

TREMONT AND SUFFOLK MILLS. Drillings, Standard Brown, Blue, and Bleached; Jeans, Fine, Brown, Colored, and Bleached; Sheetings, Medium and Fine, Brown and Bleached; Canton Flannels, a most complete line in great variety of Weights, both Brown and Bleached.

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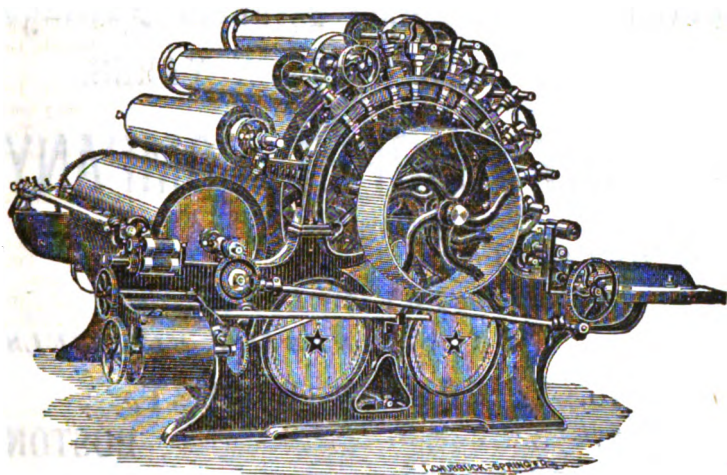
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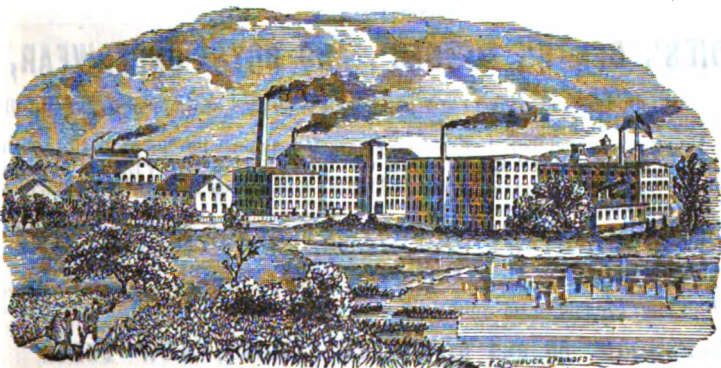


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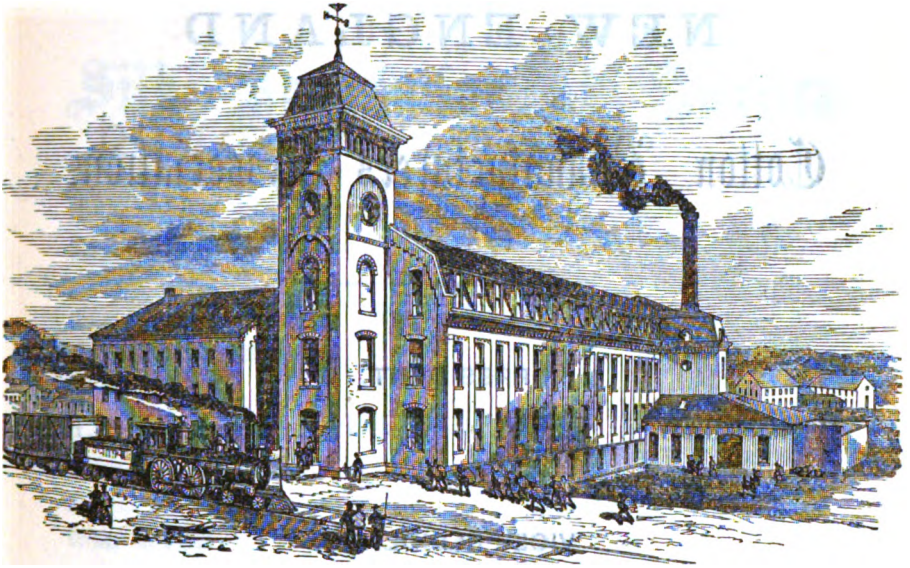
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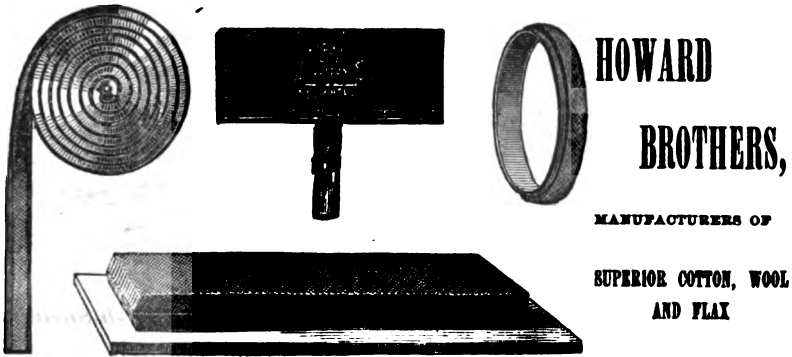
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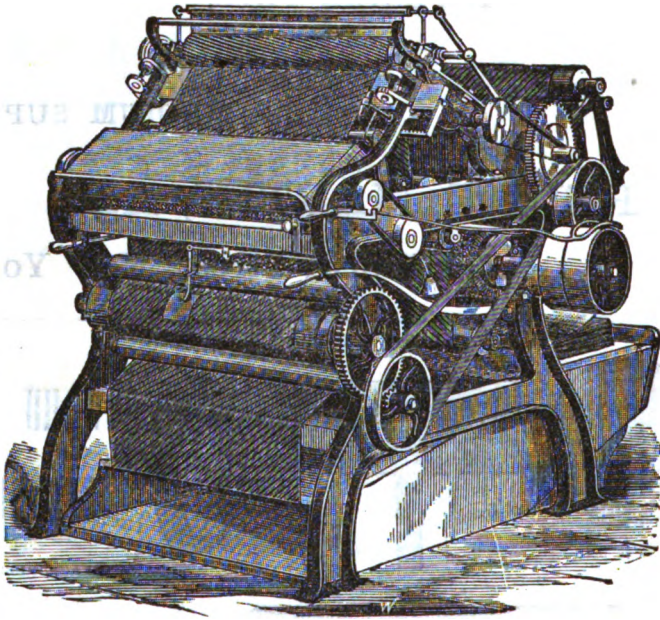
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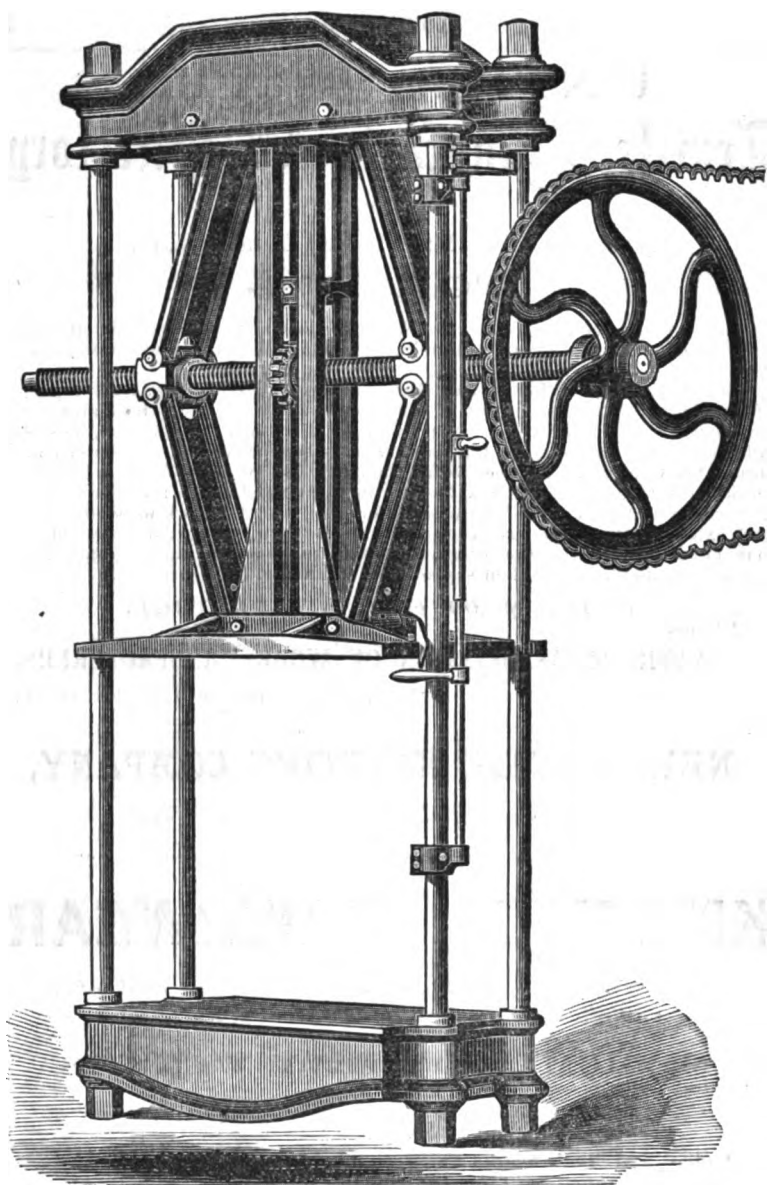
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The Association
BULLETIN

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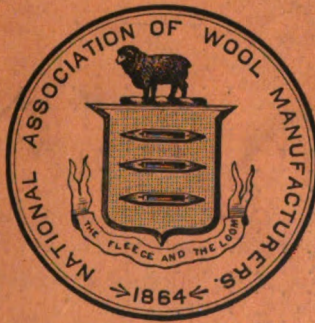
National Association

OF

WOOL MANUFACTURERS.

FOUNDED NOV. 30, 1864.

1874.



EDITED BY JOHN L. HAYES.

BOSTON:

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1874.

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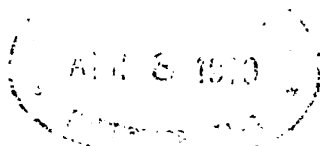
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BULLETIN

OF THE

National Association of Wool Manufacturers.

VOL. V.] BOSTON, APRIL — JULY, 1874. [No. II.

PROCEEDINGS OF GOVERNMENT MEETING. — THE RECIPROCITY TREATY.

A MEETING of the government of the NATIONAL ASSOCIATION OF WOOL MANUFACTURERS was held at the St. Nicholas Hotel, in New York City, on the 25th day of June last, and was attended, although not numerously, but by representatives of the most important interests and sections of our national wool manufacture. The object of the meeting was to consider the questions of the day immediately affecting our manufacturing interests. The question of the Reciprocity Treaty with Canada, which had just then so suddenly and under such singular circumstances been brought to public attention, overshadowed all others at this meeting. The text of the treaty, as published in the "Tribune," was for the first time brought to the notice of most of the members present. It would have been instructive to the senators who will have to act upon this treaty to observe with what singular unanimity the mere project of the treaty, as well as its details, were condemned by the practical business men present, and men who had been accustomed to consider public questions in the broad view of patriotism as well as of personal interest.

The sentiment of the meeting was finally expressed in the following resolutions, which, after a prolonged discussion, were

adopted without a single dissenting voice, no other business of importance having come before the meeting :—

1. *Resolved*, That the government of the National Association of Wool Manufacturers feel themselves called upon to express their views of the consequences to be apprehended from the proposed Reciprocity Treaty with the Dominion of Canada to the manufacturing and industrial interests of the United States.

2. *Resolved*, That we are warned by the examples which history furnishes of the advantages which Great Britain has invariably secured by her favorite method of acquiring commercial supremacy, to distrust any treaty with that power surrendering commercial privileges.

3. *Resolved*, That the promise of reciprocal advantages from the free exchange of certain manufactures is a delusion, since the circumstances of the Dominion and of the United States are so different that production cannot be made on terms of equality ; that the high rate of internal taxation in the United States required by our more complicated organization, and the higher revenue duties demanded by the expenses of the general government and the debts of the war, make the cost of production in the United States so much greater than in Canada, with low taxes and duties, and cheapness of labor attested by constant emigration to this country, that the free exchange of manufactured products would end in the suppression of our own production. This, we believe, would be specifically true of three articles enumerated, which are within the special cognizance of the Association ; viz., “ tweeds of wool solely,” “ satinets of wool and cotton,” and “ felt covering for boilers.”

4. *Resolved*, That the apprehended consequences of the proposed treaty, serious as they are to ourselves directly as manufacturers, are not less so to the agricultural interests with which we are so closely allied, and upon whose prosperity our own indirectly depends ; that in illustration of the ruinous consequences of a treaty which admits all the products of the field and forest free of duty, and practically excludes the farmers of the United States, with barely one or two exceptions, from all direct advantage from a protective tariff, we refer to the bearing of the treaty on the raw material of our manufacture, — *wool*.

5. *Resolved*, That as for reasons above enumerated the American farmer cannot compete with the Canadian in the production of the

kind of wool which forms the specialty of Canada, the admission of Canada wools free of duty would arrest the now rapidly increasing development of the most promising branch of American sheep husbandry, that producing at the same time mutton and combing or worsted wool; that this branch of sheep husbandry, which had hardly an existence here at the time of the repeal of the former Reciprocity Treaty, received an impulse from the protective duties of the tariff of 1867, which gives promise of an abundant domestic production; that it is, in a national point of view, one of the most important branches of agriculture; it can be pursued advantageously in the oldest settlements, it diminishes the cost of animal food, it enriches the land, and it supplies the worsted manufacture, a branch in which there is room for the greatest development, and which has so enriched England. Therefore —

6. *Resolved*, That the offered boon of free Canadian wools would be dearly gained at the certain cost of the loss of our own production of combing wools, and the danger of a revision of a tariff satisfactory to both branches of the woollen industry.

7. *Resolved*, That disclaiming any other authority for our opinions than belongs to us as citizens, we protest against the encroachment upon our civil rights involved in the assumption of the proposed treaty; viz., that questions affecting the revenue may be decided by the treaty-making power, without consultation with the House of Representatives, to whose determination such questions are committed by the Constitution.

8. *Resolved*, That we will welcome the Canadians to a free participation in the advantages of our markets, when they are prepared to be partakers of our burdens and defenders of a common nationality, as thereby we may extend the line of our protective defences, and close the postern through which British goods now surreptitiously enter our territory.

9. *Resolved*, That those who desire true free trade with Canada, such as is enjoyed by the different States of a common country, will find their hopes frustrated by a treaty which shall permit the Canadians to sell their natural products in the dearest market in the world, while buying their chief manufactures in the cheapest.

10. *Voted*, That copies of the above resolutions, signed by the president and secretary, relating as they do to a question of great public interest, be sent to the kindred associations, and each of the leading newspapers of the country, with a request for their publication.

The executive officers of the Association, when apprised of the imminent danger of the negotiation of a treaty, had communicated their fears to the leading representatives of their allies, the wool-growers of the United States. The prompt and timely result of one of these notices of the Association was the following letter, written by Mr. GEORGE GEDDES, one of whose high titles to distinction is that he was always recognized by the late Mr. Horace Greeley as the most authoritative representative of the agricultural interests of the State of New York. The letter of Mr. GEDDES unquestionably had no little influence in causing the postponement of the question by the Senate.

FAIRMOUNT, ONONDAGA COUNTY, N. Y., June 15, 1874.

To the Senators of the State of New York, in Congress.

GENTLEMEN, — I have this morning received a letter from the secretary of the National Association of Wool Manufacturers, Mr. John L. Hayes, of Boston, in which I am informed that there is great danger of free trade being established between the United States and Canada by a treaty, and he says: "Such a measure" (as free trade in wool) "would directly conflict with the policy of this Association, which is, ample protection to the wools of the United States. Whatever temporary advantage would accrue to us from free Canada wools would be counteracted by the discouragement given to our own production of combing wools. This Association is therefore utterly opposed to the proposed Reciprocity Treaty."

If, as certainly is shown by the foregoing extract from Mr. Hayes, the manufacturers of woollen goods believe that the growing of combing wools in the United States is really so important to them as to make them favor protection of the growers, it will hardly be necessary for me to say any thing by the way of giving force to his opinion, beyond adding that he but expresses the deliberate judgment of the body he represents.

But wool is only one of the productions of Northern agriculture that is about to be sacrificed in the interests of commerce. Barley has been one of the leading crops raised along the line between the United States and Canada. Most of this crop is used for making beer. So little is used for any other purpose that it may be considered simply as the leading constituent of that beverage. Canada

raises and sends to us great quantities of barley every year, and but for the fact that the price is entirely regulated there by the price here would raise and send us much more.

The duty on barley is paid by the raiser, as will appear by taking the prices in any Canada market, and adding cost of transportation, duties, and commissions, to find the price in New York City. But if the consumer paid the duties, what other thing could better bear the tax? Beer is not a necessity of life, and it would be hard to find a luxury better adapted to furnishing revenue. Barley is too bulky to be smuggled, and is therefore a convenient commodity on which to lay a heavy import tax.

To allow Canada barley free markets here is to encourage its growth in Canada, and to discourage it in the United States. The cold climate and heavy clay soils of the British American possessions are well adapted to this crop; and having a sound money system, and greatly cheaper labor than on our side of the line, the Canadian farmer can undersell us in our markets, if we give them to him free.

Cheap labor and a sound currency are sufficient to give the Canadians the advantage in every branch of farming in which both countries are interested. Free trade between the two countries is all they desire to make them prosperous and populous. Draw a line on a map, by extending our boundary-line of forty-five degrees west from St. Lawrence County, N. Y., to the waters of Lake Huron, and you will have south of that line a country as large and in its agricultural capacity superior to the State of New York. Give our markets free to such a country for twenty-one years, and subject our producers of wealth of all kinds to the payment of our debts, — kindly asking no contributions, direct or indirect, from any thing but our own labor, giving up all our advantages of position, — what must be the result? The ratification of such a treaty ends all thought on the part of Canadians of annexation, and the current of emigration turns from our shores to countries more wisely governed.

Figures and statistics are cunningly used by commercial interests to show that, on the whole, we will gain as a nation more than we shall lose. The answer to all these figures is, Why, then, do the statesmen of Canada work so hard every year to bring about such a treaty? They have been in Washington every year since the termination of the old treaty, trying to negotiate a new one, and they are wise in their generation.

Mr. Hayes's letter says: "The friends of reciprocity are sanguine

of success. The boards of trade in the commercial centres advocate it. It will succeed, unless the agricultural interests of the United States, which immediately suffer from this measure, bring their powerful influence to bear upon the Senate."

The agricultural interests have no organization through which to act; and they may be destined again to be, as they have many times before been, sacrificed to interests that are organized so as to be felt in the government of the nation.

As the preliminary measure of general free trade, a reciprocity treaty will find friends; and if the Republican party proposes to adopt such a national policy, to be followed in due time by repudiation, words of protest are useless. But, entertaining the hope that no such future is before either the Republican party or the country, I venture to thus briefly state some of the reasons that appear to me to be imperative against surrendering our markets free to people who have no part of our debts to pay.

Very respectfully yours,

GEORGE GEDDES.

But perhaps the authority which will have most weight upon this question with the country is that of the distinguished representative from Maine, Mr. Speaker BLAINE, the first one of our public men who spoke upon the question of the treaty, who declared his opinions with a positiveness and distinctness of utterance which is as rare as it is refreshing in one who has, or is entitled to have, such high aspirations for the future.

Mr. BLAINE says, in the letter to his constituents of July 3:—

"It is well known that the authorities of Canada are trying to negotiate with our government for a reciprocity treaty, which, like its illustrious predecessor and namesake, maintains the reciprocity all on one side. The treaty of that name, which was terminated in 1866, was cruelly oppressive to the people of Maine, and inflicted upon our State, during the eleven years of its existence, a loss of fifty millions of dollars. It presented the very singular anomaly of giving to the Canadians the control in our own markets of certain leading articles on terms far more favorable than our own people had ever enjoyed. The utmost stretch of the Divine command is to love our neighbor as ourselves, and I can certainly see nothing in personal duty or public

policy which should lead us to prefer our Canadian neighbors to our own people.

“The treaty of reciprocity now proposed is understood to embrace the admission of Canadian vessels to free American registry, and the full enjoyment of our coasting and lake trade. Thus the ship-building and commercial interests of the United States, reviving so prosperously of late, and just recovering from the terrible blows dealt by British-built cruisers during the war, are again to be struck down by giving advantages, hitherto undreamed of, to the ships of the very power that inflicted the previous injury. And the Democratic party of Maine have pledged themselves, in their State convention, to the policy that includes this disastrous attack upon the interests of our State, and their candidate for governor has fully committed himself to the extreme doctrine announced by the convention.

“The form of reciprocity proposed by the government of the Dominion of Canada lacks every element of the seductive title by which it is sought to commend it to our people. What is it? Why, simply this: that if the United States will agree to admit certain Canadian products free of duty, Canada in turn will agree to admit certain American fabrics free of duty. But the class of men to be benefited and the class to be injured in the United States are entirely distinct and separate, having nothing in common, either in locality, industry, or investment. To compensate the surrender of one interest in this way by the advancement of another has no more element of reciprocal justice in it than for A to take a pair of horses from B, because C took possession of a yoke of oxen belonging to D. To illustrate: if the United States will agree to admit Canadian vessels to American registry and the coasting trade, Canada will admit straw-hats, mule-harness, and rat-traps, free of duty. In this you will observe that Canada gets the full advantage both ways; while the United States, for a possible enlargement of petty trade, consents to subordinate and sacrifice an interest that represents our distinctive nationality in all climes and upon all seas, — an interest that has given more and asked less of the government than any other of similar magnitude, — an interest more essentially American in the highest and best sense than any other which falls under the legislative power of the government, and which asks only to-day to be left where the founders of the republic placed it nearly a century ago.

“Against the whole policy of adjusting revenue questions by the treaty-making power, I desire to enter, on behalf of my constituents,

an emphatic protest. The Constitution gives to the House of Representatives the sole and exclusive right to originate bills of revenue, and this great power should be kept where it can be controlled by the direct vote of the people every two years. It may very well be that sundry articles of Canadian product should be admitted free, or with diminished duty; it may well be, also, that Canada would find it advantageous to admit certain articles from us free of duty. Let each country decide the question for itself independently, and avoid the 'log-rolling' feature of a treaty, in which it will inevitably happen that certain interests will be sacrificed in order that others may be promoted. Let us simply place Canada on the same base with other foreign countries, — taxing her products or admitting them free, according to our own judgment of the interest of our revenue, and the pursuits and needs of our people, — always bearing in mind that in governmental, as in family matters, 'charity begins at home,' and that 'he who provideth not for those of his own house is worse than an infidel.'"

It is not our object to discuss the questions of reciprocity at present. Such facts and arguments as we may have in our possession, or may collect, may be more effectually used at a later period. But we deem it our duty at once to demonstrate the unqualified opposition of our Association to this measure, and to declare that we have not yet seen or heard of a single wool manufacturer or wool-grower who is not opposed to it. In the mean time the following letter, published in the "Boston Traveller," will throw some light upon the relations of the treaty to the woollen interest: —

THE RECIPROCITY TREATY AND WOOLLENS.

In the proposed Reciprocity Treaty between the United States and Canada, I observe that woollen rags, included in the term "rags of all kinds," may be admitted at one-third less duty than they now pay, after June 30, 1875, &c. Also "wool," "tweeds of wool solely," and "satinets of wool and cotton," may be admitted at one-third less duty than they now pay. Secs. A and C.

Although there is a provision in the treaty that these articles "being the growth, produce, or manufacture of the Dominion of Canada or of the United States," it would seem to prohibit any

goods or material of the growth, product, or manufacture of any other countries, yet I do not see any provision for carrying into effect, strictly and absolutely, that injunction. The treaty does provide for a commission, to be maintained at the joint expense during the operation of the treaty, for the proper regulation of *light-houses* (Art. 10), and a commission to *promote the propagation of fish* (Art. 11); but I do not see that any commission is appointed or any means whatever provided which would prevent the fraudulent importation of woollen rags, which cannot possibly be identified as the product of Canada, and which may be the product of any other country; and the same remark applies to tweeds, which, under Canadian custom, constitute what in our markets we call fancy cassimeres, and a variety of styles of woollen goods. I see no provision by which these are to be identified and sworn to and proved to be the product only of Canadian machinery, and the same remark applies to satinets of cotton and wool. Even if living under the present tariff this portion of the treaty could be tolerated by the woollen interest with satisfactory provision against fraud, it seems to me that opportunities for fraudulent importation of the above articles are so glaring that the woollen manufacturers of the country ought to see to it that there is some amendment to the treaty (if it is to become one) by which nothing else than the *bona fide* manufactures of the Dominion of Canada can be brought into this country, and some provision made by which whoever undertakes to import fraudulently shall be severely dealt with. I cannot see why, under the general term of "tweeds," English cassimeres may not be brought through Canada, or why woollen rags, being the product of any other country, may not be brought through Canada, because it is apparent to all familiar with these articles that it is next to impossible to identify the same. The danger in regard to wool is even greater than any of these articles, although Canadian wool is mostly of Class 2 under our tariff, — that is to say, combing wools. Yet there are grown in various other countries, England and Ireland especially, wools so very similar in character and appearance that it would require the judgment of a very experienced expert to detect the difference, if, indeed, in many cases there would be any; and in view of the ignorance of custom officers on the frontier, whose duty it would be to examine the article, it seems as though the road to importation of English and other wools of similar character is made very easy, and thus an important reduction made in our tariff on wools of the second class. I under-

stand that this treaty received the indorsement — whether in detail or not I cannot tell — by our Board of Trade and the Chamber of Commerce in New York, and that thereby the merchants of Boston are committed before the governments of the two countries as in favor of this treaty. In my own judgment, it would be well that at the next meeting of the Board of Trade the commission merchants and manufacturers interested in the wool and woollen trade and manufacture should be present, and remove, if they can, the impression that this part of the treaty has received their indorsement.

I can speak from a personal knowledge of the disposition of the Canadian manufacturers, with some of whom I have conversed within the last month upon this subject; and they would consider a blow had been struck to their interests by their government, if the goods which were the product of the United States should be admitted to their country free of duty, or practically so, as this proposed treaty contemplates. It seems that this treaty has been negotiated in secret, and an attempt made to push it through the Senate, without having the voice of the country upon it and its provisions; and I therefore respectfully suggest that, either by action at the next monthly meeting of the Board of Trade, or by some other organized action, a method of testing the sentiment of the country be taken, especially on the above provisions as I can see no reason why the long suffering woollen interest of the United States should be made to suffer, in order that the United States government may escape the payment of whatever may be due to the Dominion of Canada in behalf of the fisheries or in behalf of the shipping interests. The treaty seems to be one negotiated in such a manner as “to rob Peter to pay Paul.” Another pertinent inquiry is, if the Board of Trade and the Chamber of Commerce abolished moieties to informers, and now take an easy way of getting goods into the country under a treaty which they can not do by a provision of law. For, without some reward to those who might inform against fraudulent importation, it seems that the above-mentioned article can be very easily brought in *via* Canada, under a lower rate of duty than otherwise.

A WOOL BROKER.

PROFESSOR CAIRNES ON POLITICAL ECONOMY.*

THE article from the "Penn Monthly," written by its editor, Robert Ellis Thompson, is an illustration of the ability which presides over the literary magazine of Philadelphia, and which has won Whittier's tribute, that "it occupies an honored place, peculiarly its own, among our periodicals." Equally grave, though less prolix, than the time-honored "Review" of New England, it reminds us of the "North American" in its palmy days of the editorship of Everett, Bowen, and Peabody, when its economical opinions were in harmony with the policy which created the prosperity of New England.

It cannot be denied that what is recognized as the literary authority in New England is in the direction of Free Trade. This is evinced by the modern tone of the "North American Review," by the articles in the "Atlantic Monthly," and by the wide circulation in literary circles of the "Nation," with its Mephistophelian disposition to scoff at all evidence of American progress.

What is the cause of this affiliation of New England literature with the economical philosophy of England, whose chief inspiration is the desire to suppress the industrial progress of America? Is it the ignoble motive to diminish the rewards of labor, on the ground that the protective system, which raises the wages of the working-man, only increases the living expenses of the literary man? Is it because the spirit of colonial dependence still lingers in the literary mind, and the traditional supremacy of English opinions is not impaired by the palpable evidence of their selfishness? Is it from absorption in the shallowest of all intellectual work, mere literary criticism of books, that the social problems which are being worked out in the mine and factory are deemed beneath the cognizance of literature? Is it because of the intellectual inertia of the purely literary mind, to which literature is rather a resource for luxurious contemplation than a field for disturbing thought?

* Some Leading Principles of Political Economy Expounded. By J. E. Cairnes, M. A., Emeritus Professor of Political Economy in University College, Oxford. Macmillan & Co.: London, 1874.

We believe that we have here the principal source of the literary proclivity to Free-Trade doctrines. A recent astute writer on the tendencies of the German mind in the direction of political economy observes that the doctrines of the Manchester school, while discarded by the more advanced thinkers, are accepted generally by what are known as the educated, but really half-educated classes, because of the simplicity of the few propositions on which that school is founded. While the economical problems involved in the attainment by each individual nation to its highest development cannot, in the present state of social science, be formulated into simple, ultimate propositions of universal application, the Protective philosophy, or the social science which seeks the development of wealth in consistency with human welfare, although it would seem that it may be almost intuitively comprehended by practical men, cannot be pushed into half a dozen axioms or receipts to be carried in the pocket-books of autocrats of political economy.

True political economy is science. The literary mind demands of science that it shall produce its ultimatum in order that literature may be at rest, and draw its illustrations from admitted facts and principles, just as the old scholar frets at modern chemistry because it disturbs all that he learned in college. But science is never at rest: it has the world before it, with the infinite realm of unexplored facts; and political economy, if it is a science, has the features of uncertainty which belong to all inductive researches.

Still the practical man, like the miner before the geologist, often anticipates the conclusions of science; and thus the literary man, in researches which depend upon observation, is always behind the mere student, and "lingers and plays" upon the low summits which the man of affairs has left for higher and broader views of truth. It is for this reason that, while nearly all the literature, we will not say science, of what is called political economy, is of the Manchester school, the majority of the masses in America, Australia, and Canada, making more than one-half of the English-speaking race, support the Protective policy.

PROFESSOR CAIRNES is the gentleman who, when in charge of the chair of Political Economy in Queen's College, Galway, gave us perhaps the ablest contribution to the political literature of our civil war. His "Slave Power" was a masterly analysis of the nature of "the peculiar institution," and its effects in retarding the economic and industrial development of the South. It was trenchant in logic and vigorous in rhetoric; it left the advocate of slavery as a paying institution no leg to stand on. And while there was a judicial fairness of tone in all its reasoning, there was also an outspoken sympathy for the good cause that won its author a warm place in the Northern heart. Nothing that comes from his pen will fail to command a respectful hearing from the reading public of America.

During the last few years his health has broken down, and he has been obliged to withdraw from the active work of teaching. But his pen has had the more leisure to bring his thoughts before a more extended circle. First he gave the world a volume of "Essays on Subjects connected with Political Economy," and now he undertakes a new exposition of some leading principles of the science.

Professor Cairnes gives a new exposition of the science, because he is not satisfied with the old ones. He is, as is every able writer of the English school for the last twenty years, a pretty severe critic of his predecessors. J. S. Mill, Cliffe Leslie, Thornton, Macleod, Maine, R. H. Patterson, Grant, Bonamy Price, Thorold Rodgers, Lucas Sargent, — none of them have spared their masters or even each other.* Fawcett, among the authors, comes about the nearest to

* The American disciples of the English school ought to tremble every time that an able book on the subject appears in England, lest it should leak out in this country in what an uncertain state "the science" is at present. For instance, Professor Cairnes says of the doctrine of the cost of production, formulated by their favorite authority, Stuart Mill, that it is "radically unsound, confounding things in their own nature distinct and even antithetical, setting in an essentially false light the incidents of production and exchange, and leading to practical errors of a serious kind, not merely with regard to value, but also with regard to some other important doctrines of the science."

And even the published literature of the subject, if we may trust Cliffe Leslie, does not express the amount of this mutual criticism. "The English market for economic publications is extremely limited: the works on the subject are necessarily few, but it is notorious that various doctrines to be met with in the English text-books have often been questioned in lectures, articles, discussions, and private conversation; and that the general concurrence even of English economists — of whom alone English economists are apt to take account — ought not to be assumed from the agreement of these books."

Do not the difficulties of the situation explain the singularly barren character of the books produced by the school in America? While in England all is dissent and controversy, with them all is tame orthodoxy and uniformity. During one of the parades of the 69th New York regiment a gallant corporal was heard to exclaim: "Walk straight, ye divils, the Yankees is lookin' at yes!"

old-fashioned orthodoxy, while Gladstone and Robert Lowe hold fast to every letter of the old shibboleths, except when it comes to legislation about Ireland. The laws of economy which govern the rest of the world are not in force on the western shore of St. George's Channel.*

Now, while economical heresy has been the fashion in England for some years, there are a great many kinds and degrees of heresy, some of them not much better than the old-fashioned orthodoxy of J. Mill. To take up the implied parallel with the theological world, some of the heretics have got to the very root of bitterness; they have found the fundamental wrong assumption that underlies all the false conclusions. Others are merely at war with the conclusions themselves; they would fain hold fast to the old creed with one hand, and stretch out the other to those who reject and repudiate it. They would like to be *so* liberal and yet *so* orthodox, without having really achieved for themselves any higher standing ground, on which what is true on both sides is united in a higher synthesis. In a word, they are eclectic heretics.

And an eclectic heretic is our friend Professor Cairnes. He has not kept his eyes shut during all these years that have gone over his head; he has learnt much from the new thought, the new insight into history, that later literature evinces. But he tries to "stretch the old formula to cover the new fact," as Carlyle says; he will not admit that "the science" needs to be overturned to its very foundations; he thinks that its truths are essential, its errors only formal. He holds that "oversights have been made and disturbing forces neglected; and that by making a fuller statement the valuable truths

* "If English landlords, millionnaires, and economists have an interest, it is the right of eviction without reason. If they have a prejudice, it is in favor of the absolute ownership of the soil. If they have an economical conviction, it is in favor of free contract. Yet a house led by the greatest of living economists . . . has abandoned all these." — *Spectator*.

"Mr. Lowe, for example, when taunted with his old economical arguments, acknowledged that the Bill was not intended to increase wealth, which is the object of Political Economy, but to save society." — *Ibidem*.

"Free contract implies free contractors, and the main contention of Government is that, partly from historical circumstances, but chiefly from the *absence of alternative employments, the poorer tenants of Ireland are not free*; that at least one half a million of peasants, half the adult population, are compelled by the coercion of hunger to agree to any terms which will secure them the use of the soil. It is because they are not free that a penalty is affixed to capricious evictions, that a court is to settle the terms on which leases must be granted, that even on the expiring of a lease good will is to revive like a plant out of the ground." — *Ibidem*.

already discovered may be preserved, and theory be made to accommodate itself more accurately to facts." We are persuaded that he is much farther from the truth than a writer whom he has severely criticised in days gone by, — we mean Mr. Henry Dunning Macleod, who maintains that English political economy is vicious in its very method; that it has been applying the deductive method of the mathematical, when it should have been using the inductive method of the physical science. "Je suis ici," said M. Thiers in 1851, "un ordre inverse à celui qu'a suivi M. Sainte-Beuve. Il a commencé par la théorie et terminé par les faits. Moi, je vais commencer par les faits, et je finira par la théorie." But Mr. Cairnes's very first treatise was a plea for the method which begins with a theory and ends with the facts. In his "Character and Logical Method of Political Economy" (1857) he put forward the plea that this science (like mechanics, optics, &c.) had reached the deductive stage. That is, the earlier investigators, Adam Smith, Ricardo, and Malthus, having carried it through the inductive stage by the wide observation of economic facts, and the careful derivation of principles, it was now its work to start from those ascertained principles and reason downward to the facts of any given situation. He admitted, indeed, that some of the observed facts did not coincide with Ricardo's theory of the origin of rent; but then, as he naively remarked, there were others that did, so that this was no reason for rejecting the theory.

So far from the inductive stage of political economy being passed, it is hardly yet begun. Adam Smith was, indeed, an inductive student, and did lay the foundations of a true science. His "great 'Inquiry' is crowded with observations from life" (Sargent). But in the very next generation the method was inverted: "During half a century the subject was in the hands of men who constituted what may be called the metaphysical school, in the hands of Ricardo and his followers, who in the driest of styles explained the driest of propositions; in the hands of writers who, having found in the human mind a tendency toward a particular course, assumed that such tendency would be carried into action, and who, therefore, failed to verify their theories by an appeal to facts, their method being the reverse of that of Adam Smith" (*Ibid.*). The younger Mill and W. T. Thornton first broke the dismal succession of these writers in a timid, half-hearted way; but it would still be absurd to predicate of political economy, as studied and taught in England, that it is even well into the inductive stage, much less through it. Even Macleod will

not do much for it. He, like R. H. Patterson, has mastered many of the nicer features of the credit system, the very crown and apex of the modern industrial world. But he has not even sought to go down to the foundations. He thinks of himself as a vehement, upturning radical; but his pages abound in the unverified, traditional assumptions of the English school.

Adam Smith, like most men who break new ground in scientific investigations, gave himself credit for a deeper insight than he really possessed; he fell into cheap and crude generalizations that will not stand the test of investigation. He thought he discerned the tap-root of all industrial life and movement in the principle of competition; in the conflict of separate and individual interests, spurring men on to the utmost exertion, and leading them to serve the best interests of society by serving themselves. This view fell in with the ethical theories of the age of Bolingbroke and Paley, and found wide currency. Smith saw no economic duties incumbent upon government, save the removal of all restrictions upon competition, and the establishment of absolute freedom of trade. He would have men buy in the cheapest market and sell in the dearest they could find, feeling assured that this would be for the benefit of the whole world. The law of supply and demand would then remove all inequalities; labor would seek the market where it was best paid; capital would seek that which assured it the highest profits. Each nation would be able to develop its own natural capacities to the utmost, and to avail itself of the advantages possessed by others in like degree. The governments would do their best in doing as little as possible.

Mr. Malthus followed in Smith's footsteps with what may be called "An Inquiry into the Nature and Causes of the Poverty of Nations," — his "Treatise on Population." The same industrial tap-root was discerned here also, the same omnipotent law of demand and supply. There was a tendency in the human race to outgrow food. But *laissez faire*: you can't stop the excessive increase by any legislation; you will only promote it by legislation that looks to the alleviation of the condition of the poor. You are only stepping in between the transgressors of a natural law and the consequences of their act. You are only putting a premium upon their imprudence. Leave them to the struggle that their imprudence has occasioned. It is a sharp competition for existence, indeed, but withal a beneficent one. In it alone men can learn the lessons of dear-bought experience that are necessary to keep the race from a virtual suicide.

Mr. Ricardo's theory of rent was an attempt to show the validity of the law of competition, of demand and supply, in that sphere also. It certainly looked as if some other causes had been at work. The results seemed too various in character to be traced to any one law of distribution. How had this vast inequality of condition come about? The Jewish stock-broker began "An Inquiry into the Nature and Causes of the Wealth of the Few and the Poverty of the Many:" it led him to conclusions which he was sure would account for it. The supply of good land was limited, and was early made the property of individuals. The growth of society pushed men back to the poorer lands, and made them willing to pay rent for the possession of the better lands. Rents rose as still poorer soils came under cultivation, and every advance of society in years and in numbers inured to the advantage of the class who were lucky enough to be descended in line of inheritance from those who had the first choice. Competition — for the best soils, that is — was the tap-root of rent, as well as of poverty and of wealth.

The doctrine of wages that the school set forth was equally pleasant. There was, of course, a certainty of their equality in amount within any given area. If one business was better paid than another, men would take themselves to it. The market rate was therefore a fair rate; the employer did no injustice in offering it. Each party to the contract was free, and with freedom of contract none might rightly interfere. Nor was it even desirable that the market-rate should be a high one; for high wages stimulated the growth of population, and that growth, by over-stocking the labor market, pulled the rate down again, leaving the workmen physically no better off, and mentally far less contented with his lot in life. The natural rate of wages — that by which the least encouragement would be given to unwise multiplication of the species — was the amount necessary to supply the unmarried workman with the real necessities of life, and with what his class regarded as such. Above that rate it was not even desirable that wages should rise, and they would not long keep above it. The attempts to raise wages, on the part of organizations of working-men, were, in this view, futile, or worse. The whole amount of money payable in wages constituted a wage-fund that no combination of working-men would increase the amount of. Let them rather diminish the number of those among whom it was to be distributed, and thus increase the share of each. This could be effected by voluntary celibacy and by emigration to newer countries.

This is a very brief and imperfect outline, we are aware, of the structure of economic teaching raised upon the corner-stone of competition. But it gives enough to enable one to judge of the whole fashion of the edifice, and to discern how the one principle of industrial life and movement which Adam Smith thought he had discovered underlies and gives shape to it all. Wonderful were the pæans sung over its glories. For a while men heard of nothing else than "those ultimate evangels, unlimited competition, fair start, and perfervid race by all the world (towards '*Cheap-and-Nasty*,' as the likeliest winning-post for all the world) which have been vouchsafed us" (Carlyle). It was the one song "from all organs, coach-horns, jews-harps, and scrannel pipes, *pro* and *contra*, on the same sublime subject: 'God is great, and Plugson of Undershot is his prophet. Thus saith the Lord, Buy in the cheapest market, and sell in the dearest'!" (*Ibid.*) Even our Free Trade friends of the "*Spectator*" seem tired of that evangel. In reviewing a recent English publication, they say:—

"This pamphlet offers a curious specimen of a habit of mind which is fortunately a good deal less prevalent than it once was,—that of 'pure and simple' competition-worship. We have all heard the old liturgical formulas of that worship,—'the heaven-ordained laws of supply and demand;' 'the divinely-regulated mechanism of antagonistic interests,' &c. All combination between human beings is deemed 'essentially evil;' the very principle is 'pestilent;' 'the substitution of an artificial mechanism for the natural organism which Providence has provided for the harmonious regulation of industrial interests.' Such a providence is not a providence for men, but for machines."

Why has this change come over English writers? Partly through the wider currency of political economy in recent years. In the first part of the century it was in the hands of a few dry and heartless theorists, like Joseph Hume, who abjured all moral considerations as sentiment. But since it became the national creed it has necessarily occupied the attention of quite a different class,—men who have hearts in their bodies as well as heads on them, and who are able to conceive of higher interests than "the maximum of production." The present writer during the last few months has been under the necessity of making some researches in one of the largest libraries of works on political economy in the world, and found these new men any thing but dismal acquaintances. Indeed, it is impossible to read their books without feeling the liveliest regard for the authors, and

forming a kind of friendship with them. But it is equally impossible to escape the feeling that they mostly walk as men that wear shackles on their legs, and are debarred from free movement. Since Malthus, all English political economy has been a treatise not on the wealth, but the poverty of nations ; and the tradition that the world naturally drifts into increased misery and wretchedness seems to be a nightmare that few of them can shake off.

Another cause of the change of sentiment has been the careful though incidental and partial study of the facts of industrial development by English authors. We say *English* authors, for what has been done in this sort in other countries is (with one notable exception) entirely ignored in England.

Mr. Thornton, for instance, struck a notable blow at English theories when he showed (1) that the workman and the employers do not contract on equal terms when the former stands alone ; (2) That the combination of workmen in trades-unions had effected a very marked rise in English wages, even when the diminished purchasing power of money was taken into account ; (3) That as this had not been effected by any diminution of the number of the working-men, the theory of a wage-fund was not tenable.

Mr. Cliffe Leslie followed up these blows by showing that the supposed equality and adjustability of the rate of wages was a pure fiction ; that the "average rate" is a phrase without practical meaning ; that competition does not equalize wages ; that the actual rate of wages does not depend solely on competition or on any one general cause ; that no funds are certainly appropriated as a wage-fund by employers either collectively or individually ; and that the number of the working-men might be very seriously reduced by immigration, as in the South and West of Ireland, without at all improving the condition of those who remained. He further showed that trade-lines themselves furnished barriers to competition ; that in many cases it was impossible to say why one trade was paid so well and another so ill ; and that there is rarely competition for labor on the part of employers within a trade in a particular place, unless there be competition for it from without. The wages of farm labor in purely agricultural districts of the British Islands is far lower than in those where the farmer and the manufacturer are competing for workmen. But in these latter cases the assumption of the economists that a high money rate renders labor essentially dear is a mistake ; for "good wages and good food make the laborer efficient, and his efficiency helps the

farmer to pay a high price for labor." Equally strong evidence was offered that it was high wages that inspired the working-man with foresight and discretion, while inferior wages made him reckless and improvident. By comparing the cultivation of England with the *petite culture* of the continent, he disproved the doctrine, universally accepted by English capitalists and superficially probable, that the farmer consults his interest in keeping down his pay-roll, on the ground that "additional labor when employed in agriculture is less efficient in proportion" (Senior following Ricardo).*

Then came the investigations of Van Maurer, Nasse, and Sir Henry Maine in regard to the history of Land Tenure, which furnished the historical refutation of the Ricardian theory of the origin of rent. These showed that in the earliest times no market for land, and by consequence no market rate of rent, had ever existed; that even in later periods the amount of rent was fixed by custom, not by competition; that only within a century past, and partly through the influence of the teachings of Political Economists, was it held by public opinion or in law that the landlord owned the land in such a sense that his tenants had no vested rights in it, and he might do what he would with it, — might insist on the highest rent that the competition of the market would bring him. Theories of the class to which Ricardo's belongs, when widely accepted and generally believed, have a tendency to make themselves true. The doctrine of universal competition as the tap-root of industry has been one of the greatest means to separate the people of England from the soil, to concentrate it in the hands of a few persons, and to reduce the common people, from a yeoman class with recognized rights, to the rank of a landless, impoverished peasantry.

The political theory with which English political economy has especially associated itself has been slowly falling into disrepute. It is no longer held as axiomatic that "he governs best who governs least." The middle class, who ruled England and France after 1830, held fast to that principle. They were the strong, vigorous, prosperous part of the community, and therefore chiefly anxious that Government should stand out of the way and give them free play. All the changes since 1848 have tended to transfer power from this class to the one below it, — a class not strong, vigorous, and prosperous, — a class anxious very often for the helping hand of the State, and

* The machinery doctrine of "most produce by least labor" is also repudiated by Mr. Wren Hoskyns, M. P., in his "Land in England."

likely to give a large scope to the sphere and duties of government. Mr. Mill's "Treatise on Liberty" was the highest statement of the *bourgeois* theory of government. The counter treatise, "Liberty, Equality, and Fraternity," by Mr. Leslie Stephen, marks the new drift of political thought in Europe. All tides of influence have turned against the *laissez-faire* politics. The revival of the sentiment of nationality, the influence of the socialists, that of the positivists, of Carlyle and his school, and in fact of every body of teachers that seeks to take the initiative, has worked in the same direction. The removal of economic questions from the sphere of the State may be an ideal for the future to realize, but it is one of those ideals which have been hindered and postponed by premature attempts to realize it.

The revolt against the utilitarian and selfish ethics of Paley has helped in the same direction. The assumption that men are and ought to be governed only by an enlightened self-interest, and that this contributes to the well-being of society, has lost ground very decidedly since Coleridge began the attack upon it. There is a growing faith in the principle that,

Because right is right, to follow right
Were wisdom, in the scorn of consequence.

There is much less belief in the solubility of the problem, out of an aggregate of individual selfishness to evolve the degree of public spirit and self-sacrifice necessary to the well-being of society; consequently the divine right of competition is not the assured belief that it once was. There is a growing belief that industrial life *need not be* a merciless scramble for whatever one can get hold of, — that the high motives that inspire the soldier to die for his country may yet be found not out of place in the man whose vocation it is to clothe or to feed his countrymen. And therefore the best men of the English school assure us that their teaching is not an ethic; that they give no practical advice at all, but only say that under such and such circumstances a given course of action will lead to given economic results. None the less, these fine lines never have been or will be kept in view, and the new phase that popular ethics have taken has justly thrown discredit upon political economy.

For all these reasons, the doctrine of supply and demand and of competition, as the ultimate facts and fundamental economic law of industry, is in rather bad repute. It is discerned to be not quite the divine *fiat* that Malthus, Whately, and Chalmers thought it. The science which assumed it to be that does need a restatement and a

revision, far more radical than any that Professor Cairnes has given it. For it is not the outworks that are assailed now, but the very citadel. We need not restatements of its conclusions, but reinvestigations of its first principles. And it is the former, not the latter, that Professor Cairnes attempts.

The chief fault of his method has been anticipated by Mr. Mill in his discussion of the doctrine of Ricardo. If that doctrine be true, then the condition of closely settled countries should be one of steadily increasing poverty and misery. But it must be admitted that since the doctrine was enunciated there has been an immense improvement in the condition of the masses in every country in Europe. What, then, becomes of Ricardo's law, which you, Mr. Mill, accept as the very corner-stone of your science, declaring, as you do, that if this law were different all the economic phenomena of the world would be different also? "Oh! the law is all right, — valid as ever. But its operations have been checked in the period and in the countries that you name by the operation of certain *exceptional* facts. When these are out of the way, you will see that things will go on as Ricardo says they must." What are these exceptional facts, Mr. Mill? "Well, there are a good many of them; but we may sum them all up under the term 'the progress of material civilization.' Mr. Ricardo's statement was not wrong, but inadequate. The tendencies which it assumed did exist, but they were masked or counteracted by contrary forces. By taking account of these exceptional facts, we arrive indeed at formulæ more complex than those that were given by previous writers; but they form a nearer approximation to an accurate account of various social changes." And just that is the line upon which the "restatement" of English Political Economy is attempted. The ugly contrary facts are to be admitted into subordinate clauses of the new formulæ, which ought to read somewhat like the old axiom: "When the sky falls, we shall catch larks." Would it not have been more modest, and therefore more like the man he was, had Mr. Mill admitted the likelihood that Mr. Ricardo was mistaken, and that after all the world was not "drifting headlong to eternal smash" on lines of movement created by its Maker, if indeed it had One? Would it not even be more in accordance with the moral sense of mankind, if men have a moral sense, to assume that progress — material or otherwise — is the constant fact, and misery the exception? But Professor Cairnes goes beyond Mr. Mill in the energy with which he patches up the old formulas. The latter

fairly succumbed to the onslaught that Mr. Thornton made upon the Wage Fund theory, and in the "Fortnightly Review" threw some stones of his own at that fanciful fabric. Professor Jevons, also, has repudiated it, and it has little or no currency among the economists of the continent. But Mr. Cairnes takes "the orthodox side," as he calls it, on this question, and goes through the old "does-any-one suppose" and "must-we-not-assume" line of argument, as if the facts of the contrary — gathered in England, Ireland, and Belgium — had never been put on record. For instance, the rise of wages in some parts of England during the recent strike of the farm laborers should — if there be a fixed Wage Fund — have put wages down elsewhere. Is any one surprised to find that it had exactly the opposite effect? As Cliffe Leslie puts it, the wages of the individual workman no more depends upon the sum total of the wages paid in the kingdom than the income of the individual citizen depends upon the sum total of all the incomes of the kingdom.

Professor Cairnes divides his book into three parts: The first and most abstract is a discussion of *value*; the second takes up the subject of *labor* and *capital*, and contains the defence of the Wage Fund, to which we have just referred; the third is on the subject of *international values*, and is of course meant to embody those "conclusions for use" and "conclusions for doctrine" (to use the old Puritan phrase) for the sake of which economical works are still published in England.

The first part contains a very severe — yet of course very kind and respectful — criticism of the teachings of Mill and Ricardo as to the nature of value. In their view, the measure of value was the "cost of production," and this conception was connected with the notion of the universality of competition and its efficiency in all directions. Mr. Cairnes does not reject the statement, but he calls attention to the fact that competition works within very strictly drawn lines. They assume the existence of unrestricted freedom of competition, whereas he finds groups of laborers between whom there is no competition whatever. But, when he comes to analyze the cost of production into its elements, his dissent is much more emphatic. Mill counts wages among the elements of cost. This — Professor Cairnes thinks — is to look at things purely from the capitalist's point of view, not from the standpoint of the broader interests of society. Wages in his view is to be ranked alongside the profits of the capitalist, and the true elements of cost are the labor of the workman and the abstinence of the

capitalist required for production, and the risks undergone by both the laborer and the capitalist. He regards the two as engaged in a sort of partnership, in which the rate of profits that falls to either is an index of the gains of the other. If therefore there is a high rate of wages in the United States, it is because there is a high rate of profit also; and so far from this being a reason for protecting the American manufacturer, it is in fact a proof that he needs no protection, for a high rate of wages involves a low cost of production! The American demand for protection means "a demand for special legislative aid in consideration of the possession of special industrial facilities; a complaint, in short, against the exceptional bounty of nature." "Capitalists and laborers receive large remuneration in America, because their labor produces largely." The return which nature yields to a given sacrifice of labor and abstinence is more liberal in America than in England, and therefore wages and profits are higher; both being continually limited by the value of the products jointly produced by capital and labor. The assertion that they cannot compete with English cotton spinners and cutlery makers means that they cannot do so "consistently with obtaining that rate of remuneration which is current in the United States. . . . It is as if a skilled artisan should complain that he could not compete with the hedger and ditcher. Let him only be content with the hedger and ditcher's rate of pay, and there will be nothing to prevent him from entering the lists even against his rival."

There is something grotesque in the applause with which this profound piece of reasoning has been received in England. "The Saturday Review" "would fain hope that some of the Protectionists of that country [i.e. the United States] would read and digest Mr. Cairnes's criticism; but we much fear that they require to be educated before they can appreciate his arguments, and to be rendered less selfish before they would admit that the arguments, however sound in themselves, should lead them to prefer national welfare to personal profit." Cliffe Leslie, while severely criticising every other part of the book, admires its "valuable criticisms" of "Mr. Brassey's proposition that dear labor is the great obstacle to British trade, and of the argument of American Protectionists, that the States with their high-priced labor cannot compete with the cheap labor of Europe." "The Athenæum" is full of "satisfaction" because Mr. Cairnes "entirely recasts the theory of the cost of production, and thereby clears away, to a great extent, the [London?] mists and fogs by

which the doctrines of international trade and international values are surrounded. If a return could be made of the number of students who have tried and failed to get over this double *pons asinorum* of political economy, an approximate estimate might be formed of the amount of gratitude due to Professor Cairnes for his latest contribution to the science."

Professor Cairnes assumes, without taking the least trouble to verify the assumption, a fixed ratio between the profits of labor and those of capital, equal for all countries and all states of society. But that ratio varies with the different conditions of different countries. In old and aristocratic countries, where the prestige of ownership and the social superiority of wealth is great, the tendency is to give a much larger share of the joint products of labor and capital to the latter. In a new and democratic country, where "one man is as good as another, and a heap better, too," where the prestige of social and political weight is with numbers rather than with wealth, the tendency is exactly the opposite. The recent history of England shows the relation of democracy to high wages. Since Mr. Disraeli's Reform Bill became a law, and established household suffrage, the working-men of England have secured such an increase in their wages as would, if effected as suddenly in the same ratio on our side the ocean, put a period to half the industries of America. In view of that change, well known to every observer of industrial life in England as effected without any corresponding increase in profits, how can Professor Cairnes and all his critics unite in the assumption that there is a fixed ratio between profits and wages, and that high wages of necessity imply a low cost of production?

A Wolverhampton iron-master, for instance, says that his "hands" get "little less than two and a half times as much per hour or per measurement as they did three years ago." A comparative table of the wages paid to Welsh colliers "demonstrates that during the interval of 1871 to 1874 wages have increased to an amount averaging not less than 100 per cent." Now, if high rates of wages are invariably the index of a low cost of production, it must follow that a rise in the rate implies a fall in the cost of production. The iron-men and colliery-owners of England should rejoice that Professor Cairnes has proved this; but we doubt if the proof will put money into their pockets. They groaned at the state of their balance-sheets last year, even though they showed dividends above the American average. But now at last they should be comforted.

On the other hand, what have been the profits of manufacturing in America? During the fifty-one years that ended in 1870, the dividends declared by the cotton and woollen manufactories of New England did not equal nine per cent a year, — and this, be it noted, leaves out of account the many companies who failed and lost both capital and interest. Only those who come to land hang up votive tablets. During the protectionist period, 1824–32, it was over $6\frac{1}{2}$ per cent; 1842–64, over $10\frac{1}{2}$ per cent; 1860–70, over $11\frac{1}{2}$ per cent. Now Mr. Cairnes himself estimates American wages at twice English: does he mean to tell us that the annual profits of the loom-lords of England during these periods were one-half the ascertained profits of our New England manufacturers? As to the other great competing industry, the iron trade, on Professor Cairnes's theory the advantage is all on the side of England; for the wages paid to iron-workers in Birmingham and Sheffield are much higher than those paid in Pittsburg and Johnstown. Yet the iron region of England is full of loose talk about the enormous profits of the iron manufacturers "in the States," and the high rate of wages in England is groaned over as one of the reasons why their American competitors are going ahead of them. They point to English companies trying to get their men to accept more moderate terms, and offering such as these: £1 a day for sheet-rollers; 15s. for shearers; 13s. for furnace men. And even these are rejected. When these rates were reported in America, they obtained no credence; it was said, "There is a mistake somewhere." But there is no mistake. The English workman is at last insisting on a full share of the profits of his labor, and is succeeding. He is getting higher rates than his American competitors, because the profits of his employers have been far beyond those of the American manufacturer.

Let us look a little closer at the bit of advice that Professor Cairnes is here offering us. We understand him to mean that, in other fields of investment than the manufactures that need protection, the American capitalist can obtain a high return for his money. But, when he betakes himself to manufacturing, he finds the rate of wages fixed by what men get in those other spheres, and at the same time his own expectation is to obtain as high profits as he would get in farming, or planting, or manufactures that need no protection, or transportation, or commerce in general. He has three choices then: (1) to keep out of manufacturing the articles that need to be protected; (2) to go into their manufacture, pay the high wages, and be content

with English rates of profit ; (3) or to ask the Government to enable him to make as much in this field as he would elsewhere, by imposing duties upon his foreign competitor. On the principles of political economy, as Professor Cairnes expounds them, the second is out of the question. He looks to see capital betake itself to the field where it met with the highest returns, and would think the capitalist a fool for staying where he got less. On the same principles the third choice should be ruled out, and Government should turn a deaf ear to all such appeals, for they simply ask the people to tax themselves for the benefit of a class. Therefore Professor Cairnes is shut up to the advice that Americans should manufacture only those articles that need no protection. *In fine*, the whole argument amounts to no more than the old plea, that every nation should keep to the occupation in which it is now able to compete with others in the cheapness of its products. "The ambition of the Americans," says "The Saturday Review," in expounding the new argument, "is in fact to compete not merely in those commodities in the products of which they have a great advantage, but in all commodities ; and this pretension could only reach its legitimate end by destroying all international trade whatever." All the new elements of the argument, such as the interference that American manufacturers make large profits because they pay large wages, are gratuitous assumptions with no basis in fact. And that plea means that the industries of the world may be best concentrated at a few great centres of wealth and population ; that the nations less advanced will be best served when they keep their farms on one continent and their workshops on another ; that they will get goods cheapest when the foreign producer is under no check from home competition ; that they will best economize their labor by having no employments but open-air work for robust men, and by employing a vast amount of that in transportation ; and that the industrial example of Turkey, Canada, and Portugal is more admirable and profitable than that of France, Belgium, Denmark, Sweden, Prussia, Russia, and Australia.

We do not suppose that Professor Cairnes has taken any pains to ascertain what would be the effect of the adoption of his advice upon the industry of America. His science, as Mr. Senior assured the French, is not *avide des faits*. Thanks to our double septennat of tariff legislation, the result would be far less disastrous than it would have been fifty years ago. And the day will come, if we have the wisdom to persist, when we will be as independent of tariffs to protect

the great staples of manufacture as the tides are of Parliamentary or Congressional legislation. The "sickly manufactures" that germinated and bore fruit in "the hot-house of Protection" are already competing for the world's markets with those of Europe. Many of them would have nothing now to fear from any fair and honest competition with foreign wares; but until the capital of our country has grown to such power, and can afford to make such sacrifices as that of England, it will not be either wise or fair to expose it to the unfair competition, the wholesale underselling, which are among the best known weapons of industrial warfare practised in modern Christendom. It will be well to follow the example of England in this respect, but for different reasons: after practising Protection for half a millennium, and developing her industrial power to a point that defied competition, she kept her tariff laws in force for thirty years after her manufactures had ceased to have any direct need of them.

We cannot pass by two assumptions, in the quotations we have made, without notice. "The Saturday Review," "the newspaper of the period," wastes some moral pity (more than flavored with contempt) upon the selfishness of the American Protectionist. It conceives of him as being always a manufacturer, with a direct personal interest in high tariffs, making money by "taxes on consumption" paid by the nation at large. This notion of him is indeed the common one in England, because people will not take the trouble to give half a thought to the matter. It is so much easier and pleasanter to make up your own notion of an opponent, and to affix to him such moral characteristics as will justify your contempt, than to find out what manner of man he really is. If only the persons who are directly interested in manufactures were to uphold the American tariff, it could not hold its own for a single year. If it had not been demanded by the great body of the nation, which is on the whole far more engaged in agriculture and commerce than in manufactures, it could never have been enacted. The most fervent advocates of protection in America are those who had and have no direct interest in the matter,—who profit by it only in so far as the whole nation is benefited. Such were Alex. Hamilton, Clay, Webster, Colwell, Greeley, Dan. Raymond, Willard Phillips (an importer), John Rae, and a host of the past; such are Henry C. Carey, Wm. B. Kelley, Horace Bushnell, and a great multitude of importers, farmers, and tradesmen of all sorts in the present. The nationalist views which led to the enactment of the present tariff "are not supported," says Sir Charles Dilke, by a selfish

clique, but rest on the generosity and self-sacrifice of a majority of the population."

Professor Cairnes assumes that *the* argument for protection is the difference between English and American wages. It is remarkable that even so much of Protectionist logic has reached the ears of an English economist: we must surely set it down to the fact that Professor Cairnes has been busied about an American topic, that he has heard this much of what his Protectionist friends — for we are his friends — have to say. But, if he had taken the trouble to read the recognized authorities on our side, he would have found a good many other things worthy of his notice,—arguments that the question of larger or smaller profits do not touch at all. For the science of National Economy, as pursued in America, does not confine itself to questions of money-making. It addresses itself to the larger problem of the full development of the national life on its industrial side. It begins by asking what is the industrial characteristic of an advanced and advancing society, and finds that it is a varied industry. It asks how this can be enacted, and finds a chief obstacle to its growth in the unfair competition with nations more advanced in capital and industry and more densely peopled. It is met by the objection that, if it decline this competition, the people will be deprived of their right to buy as cheaply and sell as dearly as they can. It gives two answers: (1) That even if this were the case, yet the higgling of the market place, the unrestricted freedom of competition, is no divine ordinance to which every thing else must give way. It always has given way, whenever human relationships have interfered with it. Such a relationship is the national brotherhood, divinely constituted in the existence of this nation. Every nation may therefore—as every family does—constitute itself one of those "non-competing groups," whose existence English economists have been fairly forced to admit. (2) The creation of a diversified industry is a measure of temporary sacrifice, it may be, for the ulterior advantage of the whole and of all its parts. It is exactly in the line of the expenditure made for public education and public works. Every community is competent to make such sacrifices; the right is involved in the very conception of a nation. Protection, when adopted for this purpose by young countries, whose resources are not yet fully developed, has the sanction of all the chief Free-Trade authorities,—Adam Smith, John Stuart Mill, Michel Chevalier, P. Rossi, &c. (3) The fact of even a temporary sacrifice

is more than doubtful, (a) because varied industry affords, what uniformity of occupation does not, work for the whole mass of the people; and the problem of setting all to work is the most difficult in the sphere of national economy. A field sown with several kinds of grass grows more than if only one sort were used. (b) Because the foreign producer never does sell at the lowest price that will repay him, unless he meets with native competition; and, if native competition attempts to supplant him without protection, he throws large quantities of goods on the market at a loss, in order to destroy it and thus restore his monopoly. Protection is the enemy, not the friend of monopoly; it alone creates really Free Trade. The effect of imposing duties upon articles of foreign manufacture is to lower their prices,—sometimes at once; always in the long run, at least. (c) Because the proximity of the market makes the price of raw materials and manufactured goods approximate; its distance makes them diverge. It is therefore in the interest of every producer of the former, notably the interest of the farmer, to bring the manufacturer into neighborhood with him. (d) Because experience shows, in the cases of Ireland, Canada, India, Portugal, and Turkey, that when a weaker and less developed country engages in unrestricted competition with one possessed of a denser population, finer skill, and larger accumulations of capital, the former steadily declines in all the elements of industrial strength. English economists may find a great many reasons why this should not be the result. American economists think themselves better employed in ascertaining why it is.

We will stop here, though we have given only a sample of the arguments which we would like to see the English economists answer. They never make the attempt. "The difficulty," says Mr. Greeley, "of bringing this tariff controversy to a conclusion grows out of the fact that one party pays no attention whatever to the arguments of the other. We, who stand for protection, read the writings of our opponents, and discuss the question with direct reference to their arguments; but our adversaries coolly assume at the outset that all we have to say is nonsense and absurdity, dictated by selfishness or bigotry, and never take the trouble of listening to us for the first minute. Thus, after we have patiently met their arguments, point after point, and, as we think, refuted them, they simply repeat their previous assertions, paying no attention to our replies, and deeming themselves unanswered, because they have not looked at the answer." "It would seem," says Sir Charles Dilke, "as though we Free Traders had become

nearly as bigoted in favor of Free Trade as our former opponents"—the English landlords, to wit—"were in favor of Protection. Just as they used to say, 'We are right: why argue the question?' so now, in face of the support of Protection by all the greatest minds of America, all the first statesmen of the Australians, we tell the New England and the Australian politicians that 'we will not discuss Protection with them, because there can be no two minds about it among men of intelligence and education. We will hear no defence of national lunacy,' we say." As a consequence, the arguments for Protection do not seem to be known to the English advocates of Free Trade. When the present writer, about ten years ago, first found his confidence in the English doctrines, in which he had been brought up, rather shaken by the facts and arguments that Mr. Carey offers, he had recourse to the English books to have his faith confirmed. Although he had access to a pretty large collection, some by English authors, some by their American disciples, he could find no answers to the Protectionist arguments in any of them. He had to make what was then a sad confession, that Mr. Carey might concede all that they undertook to prove, without in the least vitiating the force of his own reasoning. The American was dealing with the actual facts of actual life, the societies and fellowships of men that Providence has brought into being on this earth. The others lived and reasoned in a world of things, in which pounds and dollars were the only realities. The men of whom his pages spoke were actual human beings, living in human relationships, especially citizens of a common country. Those that they spoke of were dim and unreal shadows, money-making machines, divested of all qualities save avarice and the desire of progress. He had room for moral estimates, for indignation and admiration; their world was one in which no Ten Commandments were ever uttered, and no moral sense throbbed in the breasts of the creatures who inhabited it.

"Yes," Mr. Mill would say, "Political Economy does not allow the ethical element to intrude into its sphere. But it recognizes the fact that it is not a thing by itself, but a fragment of a greater whole; a branch of social philosophy, so interlinked with all the other branches that its conclusions, even in its peculiar province, are only true conditionally, subject to interference and counter action from causes not directly within its scope. To the character of a practical guide it has no pretensions, apart from other classes of considerations. Political Economy, in truth, has never pretended to give advice

to mankind, with no lights but its own, though people who knew nothing but Political Economy, and therefore knew that ill, have taken upon themselves to advise, and could only do so by such lights as they had." "The conclusion reached by the Political Economist," says Mr. Senior, "whatever be their generality and truth, do not authorize him in adding a single syllable of advice. That privilege belongs to the writer or the statesman, who has considered *all* the causes which may promote or impede the general welfare of those whom he addresses; not to the theorist, who has considered *only one*, though among the most important of those causes." But have all the expounders of this "science" been so modest? Have we not just seen Professor Cairnes using an inference drawn from the relation of wages to profits, as a reason why the United States should withdraw protection from home industry? Give no advice, indeed! What class of writers under heaven have ever so abounded in advice and counsel,—have ever so persistently shut their eyes to all considerations that lay outside their own little sphere? Take from economists their advisory function, and you would deprive them of their very *raison d'être*.

MR. HARRIS-GASTRELL'S REPORT UPON UNITED STATES TEXTILE INDUSTRIES.

(Continued from last number of "*Bulletin*.")

WE continue from our last number our extracts from the admirable report on textile industries of the United States, prepared by Mr. J. P. Harris-Gastrell, Second Secretary of the British Legation in the United States, and published in a British blue-book of 1873.

We resume the extracts from the portion of the report relating to the cotton manufacture. The character of the report forbids condensation of the material, and abstracts would be unjust to the author, and inconsistent with our object of giving the author's exact views and facts. In order to conform to the restrictions of space, we prefer to omit the portions which

we think may be less interesting to our readers. We shall indicate the portions omitted by preserving the original numbering of the sections.

We concluded the extracts in our last number with the section numbered 101. The sections immediately following under the chapter "raw material," 102-106, relating to the "culture of cotton," "discovery of phosphates," other "improvements in cultivation," "pounds per acre," "labor," "causes of less labor power," "cotton in California," "ginning," are omitted.

The report proceeds as follows : —

107. Transportation is an important item in the cost of cotton, and the tendency in the United States is towards an increase of the cost of transportation. This subject will be briefly treated under the head of general expenses. (*Vide* paragraph 177.)

The average difference between the same grade of cotton in New Orleans and Charleston and in Boston seems usually to be one cent, or one cent and a small fraction over per pound at the same date. One to one and a half cent per pound may be taken as representing the cost of placing cotton in the markets of the North. In consequence of a combination of steamship companies and railroads, it seems that a dealer in Memphis can land cotton in Liverpool at only a fraction of a cent per pound more than he can deliver it at a terminus in New York or Philadelphia. There are projects for sending cotton at yet cheaper rates to the manufacturing markets. None of these will, however, give apparently any greater advantage in the purchase of cotton to the manufacturers in the United States than they now possess over manufacturers in Europe. In the Northern half of the United States, inland rates of transportation are higher in winter than in summer, because, as the navigation on the canals is closed, freight on railroads is increased; in summer the railroads generally carry freight below cost. This and some other causes make it of moment to the manufacturer to stock his mill and thereby lose interest on the money, and incur many small expenses, and take the risk of loss in price. Usually four-fifths of the supply is bought within the first five months, and one-half within three months after the crops begin to come in. But in small mills this is not always done. These, if inland, as in the middle of Connecticut, may get their cotton direct from Memphis by rail, two car-loads at a time.

Extra cost
at Liver-
pool in
favor of
Americans.

108. The extra cost, whatever it may be, of putting cotton in the Liverpool market beyond that of putting it in, say, the New York market, is a natural advantage which the United States manufacturer has over the British manufacturer. It is usually supposed to average $1\frac{1}{2}$ c. or nearly $\frac{1}{7}$ of 1d. per lb. in favor of the United States. It is obvious that this advantage is relatively greatest when cotton is cheapest. Whenever the days of 8 c. gold for cotton in New York may return, the advantage in favor of the United States, supposing freights and other costs of transportation to remain the same, would be about 17 per cent. At a price for cotton of 20 c. currency, the advantage at the present time is only $7\frac{1}{2}$ per cent. It would seem, therefore, to be of the greatest moment to the United States, not only to reduce her inland cost of transportation, but also to produce cheap cotton; for the cheaper the cotton, the greater her advantage in the raw material over her European competitors. These have only one offset to this advantage, the possibility of using a lower class of cotton, such as Surata. To the extent to which it is now possible to use up such cotton at a cheap rate without materially lowering the quality of the goods, this advantage of the United States is diminished.* And to the extent to which it would still be possible to so use up inferior cotton, would the probable advantage of the United States from still cheaper cotton be proportionably reduced. It will, moreover, be seen, from paragraph 110 which follows, that the natural advantage of American manufacturers may, to a certain extent, be counter-balanced by the superior advantages in the system of purchasing cotton which the English manufacturers enjoy in the Liverpool market.

Cheap
cotton.

Price of
cotton.

It is not necessary to enter into the question of the price of cotton. But it would seem that, so far as the price may depend upon the cost of growing cotton, the price will be diminished by the changes in its cultivation in the South, which will increase the production per acre, improve the quality, and attract the necessary labor for picking it. And, on the other hand, that, so far as the price may depend upon inland cost of transportation, the price may be increased. Liverpool practically regulates the price of cotton in the United States. It may be noticed also that the grades of cotton come together in price as the season advances.

Consump-
tion of
cotton.

109. It should be borne in mind that cotton in the United States is used for other purposes than spinning, and that the statistics of consumption generally include the quantity for these other uses, such as

making mattresses, &c. The New York shipping lists gave in former years, when all or nearly all the cotton was sent through the seaports, very accurate statistics of consumption ; but, in these years, when so large a quantity of cotton is sent to market by railroads, the method therein pursued is no longer applicable. The present statistics seem rather more liable to error from the absence of any uniform mode of collecting statistics of freight from the railroads.

The consumption of cotton in the United States has borne a varying ratio to the exportation during the last fifty years. The following statement, computed from the Tables in Mr. Nourse's Report, and in the "Monthly Statistics," shows this :—

The annual average was	Production.	Exports.		Home consumption.	
	Bales.	Bales.	Per cent.	Bales.	Per cent.
From 1830-31 to 1839-40 .	1,868,105	1,189,350	88½	224,020	16½
" 1840-41 to 1849-50 .	2,154,194	1,708,680	79½	434,863	20
" 1850-51 to 1859-60 .	3,895,142	2,611,740	75½	752,461	22½
In 1860-61*	3,849,469	3,127,568	81½	843,740	22
In 1869-70	8,201,159	2,178,917	68	863,908	27
In 1870-71	4,352,817	3,167,264	72½	1,168,666	27
In 1871-72			. . .		. . .

During this period the average net weight of the bale increased gradually from 350 lbs. to 400 lbs. in 1841-43, and thence to 450 lbs. in 1858-60. In 1860-61 it was 477 lbs., and since the war has gradually risen from 441 lbs. to an average of 460 lbs. The consumption in the South was not recorded till 1847-48, when it was 92,152 bales for all purposes.

It is evident from the foregoing statements that the home consumption of the United States has rapidly increased, especially since 1860, and that, too, in spite of the disastrous effect upon the cotton manufactures of the war against the South. It is now more than five times as much as it was in 1830 to 1840, whereas the exports are not three times as much as in 1830 to 1840. The home consumption has now increased from 843,740 bales before the war to 1,163,666 bales in 1870-71, whereas the exports exceed only by a little the exports before the war.

* A large surplus remained from the previous years ; hence the exports and home consumption are more than the year's production.

Of the present consumption of about 1,200,000 bales, the four States, Maine, New Hampshire, Massachusetts, and Rhode Island, take about 687,000 bales. (*Vide* also paragraph 188.)

Disadvantage of "stocking up."

110. Cotton can be bought at place of origin without the purchaser seeing it; but wool at any rate in the United States cannot be so bought. Although the cotton manufacturers have this advantage over the woollen manufacturers, they meet with some disadvantages in the purchase of their raw material. As has been already mentioned, it is customary for the mills to stock up early in the cotton year at loss of interest, cost of many little expenses, and risk of loss in price. This system obviously requires the locking-up of a large capital, and seems to render absolutely necessary a larger business capital for mills than would otherwise be needed. The system is, however, supported by the general preference of the spinners to import their cotton from the South, sometimes at, as dealers aver, a higher cost to New England manufacturers than the cotton could be bought in Boston. The chief reason for this preference seems to be that the spinners cannot depend upon the home supply of their central city, as Boston for instance. But the business method of the dealers seems also to be defective. There is, however, in Boston, a desire to remedy this state of things, and it would seem possible to make of Boston a cotton market next in importance to Liverpool.

Cotton held as cheaply.

Boston and Liverpool.

Several advantages are claimed for Boston. The Boston Board of Trade Report for 1871, to which I am indebted for most of the remarks on this subject, states some of them thus: "Cotton is held in Boston at less expense than in any other northern port, and less than in Liverpool except in the item of interest. Upon consignments of cotton from the South, there is less loss in weight by handling and damage, and by shrinkage, than in other markets. Freights by steamer to Liverpool are generally lower from Boston than from New York, because the freight steamers carrying grain and other heavy cargo, lacking light cargo, want cotton to fill up."

As the opposite custom prevails in England, it is supposed, in the United States, that the English spinners obtain over American spinners "an advantage of nearly $\frac{1}{2}$ d. per lb. in relative cost" by the habit of buying, as they require raw material, at Liverpool, the market nearest their mills, and the cheapest. At any rate it is stated that "in the average of the last three or four years the prices at Liverpool have been lower than the cost of importation at the same date."

111. As to the use of cotton in spinning, there is little to say ^{Mixing of cotton.} under this head. The practice in the United States seems to be to use one kind of cotton only, and seldom to resort to mixing different grades of cotton. In some cases the spinners, whenever it is necessary to use different qualities, keep them separate until they have passed through the cards. This system seems to have advantages.

The waste in manufacturing the raw material of cotton used to be ^{Waste of manufacture.} about 20 per cent in 1830, and has now been reduced to about 16 per cent. Hence, in this report, the waste will be assumed to be 16 per cent, and the lb. of product will be computed to have consumed 1.625 lbs. of cotton. The distribution of the waste seems to be as follows : —

Per cent.	Per cent.	Total per cent.
At breaker lapper . . 2	At first drawing . . 1	Carding 5
„ finisher lapper . . 1	„ second drawing . 1	Drawing, evening, &c. 5
„ breaker card . . . 1	„ third drawing . . 1	Railway head 4
„ finisher card . . . 1	„ coarse fly 1	Other waste 2
	„ fine fly 1	
—	—	—
5	5	16

e. Mill Supplies.

112. Prominent amongst mill supplies stands out that great store Coal. of power, the coal. Wherever water-power is not within reach at cheaper cost, cheap coal means cheap power, and cheap power is a very important item in cheap manufacturing. Notwithstanding this fact, and especially as I am pressed for time, I cannot enter so fully into the subject of coal as I should like to do. Neither do I yet possess all the materials for dealing with it as thoroughly as I could wish, although I have been able to collect some materials of interest.

119. Charcoal and wood are small items in the supplies, for mills ^{Charcoal and wood.} in the North and West, where the cord of wood varies from \$3 to \$6, or 11s. 3d. to 1l. 2s. 6d. In the South wood is much cheaper, and is generally used as fuel.

Oil is, in mill supplies, the next most important item after fuel. Oil. In Boston the prices have been, in 1870, 72 to 90 cents ; in 1871, 81 to 98 cents, and in 1872.

In New York in October, 1872, —

Sperm oil was, per gallon . . .	\$1.65 to \$1.70, say 6s. 8d.				
Olive „ „ „ . . .	1.40	1.60	5	5	
Machinery „ „ . . .	0.60	1.75 or 2	8	to 5s. 7d.	
Palm oil was, per lb. . . .	0.09	0.10	0	4	0 4½

In such a town as Fall River, on the sea-board, olive oil could, last autumn, be laid down at \$1.08 duty paid, or 88 cents without duty in gold. In this instance the tariff makes a material addition to the cost. There are a large number of oils and oily compounds for machinery competing with each other for the mill-owners' custom.

Dyes and
chemicals.

120. The prices of dyes and chemicals were, in New York, in October, 1872, as follows. [A long table printed in the report is omitted.]

These prices seem to range much higher than similar prices in England, and to a certain extent to increase the cost of manufacturing over the cost in respect of mill supplies in England. The tariff directly increases the cost of one or two of these materials. The high price of labor prevents print works from effecting an economy by, in respect of garancine, running it into vats and extracting the weaker liquid. Some mills, which, being of large capacity, keep chemists of their own, test samples before purchase, and in this way often secure best articles at a cheap rate.

Albumen.

Albumen is an important item in mill supplies. Albumen of egg costs about \$1, or 3s. 9d., and of blood about the half or less.

Shuttles.

121. Of other mill supplies, shuttles cost about 50 per cent more than fifteen years ago; and in Cincinnati, for instance, shuttles formerly costing \$4 or \$5 now cost \$6, or 1l. 2s. 6d. Card clothing is manufactured as in England, and costs, on an average, about \$1.25, or 4s. 8d. a foot. In some mills, cloth instead of leather is used; but leather is easier to repair, as in cloth the holes close up. For roller covers it was at one time thought that a substitute for leather, saving a dollar per eight spindles in a mill, had been found. It was leather except in having no fibre. It wore well through the cold weather, but melted in July.

Card cloth-
ing.

Mill supplies are only a small part of the cost of manufacturing; but it will be seen from the preceding sketch that they are a larger item than in Europe, and may at some time be somewhat lessened.

Proportion
of mill sup-
plies to pro-
duct.

The proportion in quantity of certain mill supplies to product might help to show whether or not there is an equal economy and efficiency in the Old and New Worlds in their consumption. Such statistics are difficult to obtain. But from the published statistics of Lowell and Lawrence, in which gross quantities in round numbers are sometimes given, I quote the following:—

	Per 1,000 lbs. of product.	
	Calico and print works.	Calico and delaine, &c., print works.
Coal tons	8.75	\$1.80
Charcoal bushels	1.48	0.04½
Wood cords	0.17	...
Oil gallons	1.85	0.89
Starch lbs.	55.60	112.66
Flour barrels	0.27	0.06½
Madder lbs.	616.90	
Copperas "	12.85	
Alum "	42.00	
Sumac "	49.40	
Sulphuric acid "	276.60	157.05
Bark "	98.86	
Soda ash "	86.45	
Soap "	9.90	
Portion of power in steam, No. of horse-power	2,000	500

From the list of prices at Lowell (*vide* paragraph 202), I am able, before closing this Report, to insert here the prices of the following articles : —

Prices of various mill supplies.

	Dols. cts.	£ s. d.
Belt leather per lb.	0 42	0 1 6.9
Lacing leather per side	1 15	0 4 8½
Sperm oil gall.	1 40	0 5 3
Tallow lb.	0 12	0 0 5.4
Dust or hand brushes doz.	4 00	0 15 0
Reeds, steel per beer or sodents	0 02	0 0 0.9
Card sheets and fillets per square foot	1 25	0 4 8½
Shuttles (apple tree) per doz.	6 00	1 2 6
Bobbins " 1,000	10 00	1 17 6
Potato starch, for dressing lb.	0 05½	0 0 2½
Brass castings " "	0 50	0 1 10½
Iron " " "	0 05½	0 0 2½

122. On fine sheetings, the cost of all the supplies required for keeping up the machinery, and of wear on articles used, like heddles, shuttles, bobbins, &c., is usually reckoned at half a cent (or rather less than ¼d.) per yard. This means all supplies from opening cotton to goods woven, and includes every thing from sweeping materials to the last articles required for loom cleaning.

Cost of mill supplies per yard.

Per lb. The value of mill supplies, including oil and fuel, seems to average, at a liberal estimate for the Eastern and Middle States, $2\frac{1}{2}$ cents (or $1\frac{1}{2}d.$) per pound on white work, taking the bulk of actual business, and as little as 2 cents on some kinds of coarse work. Where there is water-power, or where fuel is cheaper, this rate is proportionately reduced. On colored work the mill supplies form a larger item; and in printing they, including chemicals and dyes, make up a large part of the cost of printing.

Cost of dyeing. 123. Dyeing seems to cost about as follows for labor and materials, the labor being a small proportion only: —

In black	4c. or 1.8d. per lb.
Best black	8c. or 3.6d. „
Aniline dyes	8c. or 3.6d. „
Indigo blue	16c. or 7.2d. „
Best red	16c. or 7.2d. „

Of bleaching. Bleached goods, such as sheetings, seem to cost from $\frac{1}{12}$ th to $\frac{1}{10}$ th more than brown goods of the same kind. The operation of bleaching seems to cost from 1 to $1\frac{1}{2}$ cents a yard on coarse goods, and more on finer goods.

Of printing. 124. Printing, which includes the necessary bleaching, and in which the labor is not a half of the cost of the mill supplies and chemicals and dyes, costs, in all, from $2\frac{1}{2}$ cents to $3\frac{1}{2}$ cents and more, or from 1.125d. to 1.575d. per yard. Fine printing in modern colors seems to cost about $3\frac{1}{2}$ cents per yard. This makes from $17\frac{1}{2}$ cents to $24\frac{1}{2}$ cents on 7.875d. to 11d. per lb. It will be seen in the preceding division of this Report (paragraphs 53 and 54) that, according to deductions from the census returns, the cost of printing averaged in mill supplies about 2 cents 75 mills, or 1.24d., chemicals and dyes 8 cents, or 3s. 6d., and in aggregate cost of production about 21 cents, or $9\frac{1}{2}d.$ per lb.

As to reduction of cost of mill supplies. As regards the possibility of a diminution in the cost of mill supplies per lb. of product, it may be mentioned that it is held by many intelligent adherents of limited free exchange that certain desirable alterations in the tariff, lowering its rates to a revenue basis, would directly and indirectly take off a quarter of the cost of mill supplies by actual saving in price of materials, and by a lesser outlay in their transportation.

f. Labor.

Unit of labor. 125. The unit of labor in the United States is sometimes considered to be \$1.25, or 4s. 8d. per working day of eleven hours in a

working year of 300 days. If, as I take it, such a unit is intended to apply only to the labor of men and women, it is probably near the truth, and may be correct even for men alone. The wage of the minor and of the child would assuredly render necessary the selection of another unit of labor to represent the labor of adults and children. At any rate, the unit of labor of all hands in cotton factories may be affirmed to be at the present time \$1, or 3s. 9d. a day of eleven hours, for a year of 300 working days. This may seem rather low in comparison with the much higher cost of labor which is usually supposed to distinguish the United States from England. But I think it will be admitted to be near the truth, whenever the data to be now adduced for this conclusion are duly weighed. Moreover, the census returns of 1870 indicate the same rate, by showing an actual average annual wage per hand of all kinds of only \$288, or about 54l. sterling.*

I purpose to distribute my materials under average wages and wages by departments, for yarns and piece goods, and then for bleaching, dyeing, printing, hosiery, and miscellaneous, and to add a statement of the efficiency of labor and plant and a summary of the cost of labor.

a. Yarns and Piece Goods, &c.

126. At the outset, it should be stated that nearly all mills spin all their yarns as well as weave their cloth. They have also generally a high class repair shop, in which, moreover, they sometimes make some of their own machines.

The average and actual wages per hand in the cotton manufacture in general are in Massachusetts, in a day of eleven hours : —

Wages in
general.
In Massa-
chusetts.

	Average.	Actual.	Average.	Actual.
For men	\$1.88	\$1.87	6s. 10½d.	7s. 0½d.
Women	1.03	1.07	3 10½	4 0½
Young persons	0.91	0.95	3 5	3 6½
Children	0.52	0.56	1 11½	2 0½
All hands	1.11	. .	4 6½	. .

These are calculated in each case from the returns of more than 14,000 operatives. The average wage for hands includes some pay

* November 10. In consequence of the "panic" in the United States, there has occurred a decline of 10 to 20 per cent in mill wages. *Vide* also note to paragraph 156. — J. P. H. G.

for night work. Five establishments appear to have run 2,180 night hours, in a year of 307 days, or rather over one and a quarter hours per day per establishment. The average rate of all hands may therefore be taken at rather less. The actual wage per day in a nominal year of 300 days, taking the average working year at 280 days, would scarcely exceed a dollar.

The actual average wage of all hands in another calculation is stated at \$1.08., or 4s. 0½d. a day. In Fall River it is generally taken at \$1, or 3s. 9d. a day.

The average wage per hand in some establishments taken separately does not alter the above rates. Thus —

Men.	Women.	Young persons.	Children.	All.
\$1.88 to \$1.75	\$0.88 to \$0.67		\$0.58 to \$0.50	\$1.01
2.00 to 1.50	1.16 to 0.90	\$1.00 to \$0.75	— 0.50	0.98
— 1.72	— 0.88		0.75 to 0.50	

An establishment in which the operatives are mainly Canadian French shows an average of all hands of only 91 cents, or 3s. 5d.

At Lowell. The average wage per hand in Lowell, not distinguishing between cotton and woollen operatives, is stated in the local statistics to be for females 60 cents to 62½ cents, and for males \$1.20 to \$2 a day clear of board. The average wage in Lawrence for all hands, without distinction of cotton and wool, seems to be \$1.20 a day. The manufactures yielding these averages include print works, carpets, and in the case of Lawrence a large proportion of woollen and worsted goods. In the Pacific Mills producing calicoes and delaines, and some other goods (*vide* paragraph 184), the wages of nearly 3,000 operatives averaged in April, 1869, \$5.87 in gold per week. The average is now, according to the local statistics, \$1.20, or 4s. 6d. a day per hand. This represents the average of day wages on the basis of the monthly pay-roll.

In Rhode Island. In Providence, R.I., and the neighborhood, the average daily wage per hand seems to be for —

Men, about	2 dollars, or 7s. 6d.
Women	1½ „ or 6s. 7½d.
Youths	¾ „ or 2s. 9½d.

In Philadelphia. In Philadelphia and neighborhood the actual average wage per hand is nearly 308 dollars, or 56½. 16s. 3d. a year. This represents

an average per day of about \$1, or 3s. 9d. This result is the average of 7,000 operatives employed in yarns and piece goods, with the addition of printed calicoes, employing nearly 1,000 operatives. It should be remembered that the average daily earning may be higher if the working year be less than 300 days.

In Cincinnati, Ohio, and the West (east of the Mississippi) generally, the average daily earning is said to be higher.

In the Southern States it is rather lower, and the annual average is likewise lower.

I think that from these data it is a fair inference that at the present time the actual average wage of all hands in the cotton manufacture, in New England in particular, and in the United States in general, is about \$1, or 3s. 9d. per day of eleven hours, in a nominal working year of 300 days.

127. If the average wage per hand of all kinds in the separate manufactories be taken, there will naturally be some variation around this standard of a dollar a day. There will also be some little variation according to locality, and according to the ratio of men, women, and children. In the following statement of various manufactories in Massachusetts, it is to be recollected that the average day wage is the average of the rates per day, and not the actual average rate per day in a nominal working year:—

Print cloth.	Average day wages.								In print cloth.	
	Men.		Women.		Young persons.		Children.			Actual average per hand.
		No.		No.		No.		No.		
Mill 1	\$1.97	425	\$0.98	999	...	...	...	...	\$1.06	
" 2	1.80	84	1.05	62	\$0.88	10	\$0.88	19	1.08	
" 3	2.07	918	1.24	1,811	0.82	1,571	...	...	1.24	
" 4	1.70	120	1.30	74	1.00	80	0.88	18	1.01	
" 5	1.83	323	0.97	412	0.86	302	0.54	61	1.01	
" 6	2.00	18	0.95	18	0.84	4	0.47	20	1.06	
Average per mill . .	1.89	..	1.08	..	0.87	...	0.56	..	...	

If the average be taken proportionately by the number of hands, then the results will be:—

For men, about	\$1.90 or 7s. 1½d.
Women	1.10 4 1½
Young persons	0.88 8 1½
Children	0.55 2 0½
All hands	1.28 4 7½

The last column will give an actual average wage of \$1.13 $\frac{1}{2}$, or 4s. 3d. per day. If No. 3, which is an establishment for delaines and other mixed goods as well as print cloths, be left out, the average daily wage of men and women would be reduced to \$1.82 and \$1.03 respectively, and the actual average wages would become \$1.03, or nearly 3s. 10 $\frac{1}{2}$ d. per day.

In sheet-
ings, &c.

Mills for sheetings and the like.	Average day wages.								Average number employed.	Actual wage per hand.
	Men.		Women.		Young persons.		Children.			
	No.	D. c.	No.	D. c.	No.	D. c.	No.	D. c.		
1. Sheetings, flannels, &c.	168	1 64	224	0 86	109	0 61	52	0 25	542	1 09
2. Sheetings, drills, and fine goods . .	222	1 75	420	1 00	250	0 75	58	0 50	945	1 08
3. Sheetings, shir- tings, and prints . .	327	1 94	551	0 80	428	0 88	195	0 58	1,496	1 08
4. Sheetings, denims, and stripes . . .	90	1 64	90	1 00	93	1 02	110	0 41	383	1 13
Ditto	104	1 75	95	1 12	64	1 00	28	0 58	296	1 08
Average per estab- lishment	—	1 75	—	0 96	—	0 85	—	0 45	—	1 08

If the average be taken proportionately by the number of hands, then the result will be:—

For men, about	\$1.78 or 6s. 8d.
Women	0.90 3 4 $\frac{1}{2}$
Young persons	0.84 3 1 $\frac{1}{2}$
Children	0.41 1 6 $\frac{1}{2}$
All hands	1.07 4 0

The actual average wage will be nearly \$1.08, or 4s. 0 $\frac{1}{2}$ d. per day.

In ging-
hams, &c.

In addition to these indications of the average wage in print cloth and sheetings, the following may be given of batting, warps, duck, and gingham:—

Mills for various products.	Average day wages.								Average number employed.	Actual average of wage.
	Men.		Women.		Young persons.		Children.			
	No.	D. c.	No.	D. c.	No.	D. c.	No.	D. c.		
Batting 1	85	2 18	—	—	9	1 25	9	0 75	—	—
" 2	47	1 65	8	1 00	5	1 25	—	—	40	1 00
Warp.	10	2 00	7	1 08	17	0 79	18	—	45	1 38
Duck.	12	2 00	9	0 90	13	1 00	4	0 65	—	—
Ginghams	121	1 67	76	1 02	57	0 84	33	0 57	324	1 19

Judged by this one example of gingham, the actual average is 11 cents, or 5d. higher in colored work than in plain work. But

it is not possible to draw any trustworthy inference of general application from single instances.

In the Philadelphia district the actual average wage per hand was in Philadelphia. in 1870 (and the decrease is slight since that year),—

	Per Year. Dola.	Number. employed.
In cotton laps and yarns	290 . . .	571
In checks, gingham, and other piece goods	800 . . .	5,298

The actual average wages per day may therefore not unfairly be taken at \$1, or 3s. 9d., for that cotton manufacturing area. Moreover, in Massachusetts the actual wages paid in 1869-70 were, according to the census, as follows:—

	No.	Wage.
Batting and wadding	125	\$378.00
Piece goods, &c.	41,462	311.00
Picking and cleaning	81	440.00
Thread, twines, and yarns	2,016	823.00

This shows a rather higher average than \$1 a day in a nominal year of 300 working days. It is \$1.04, or nearly 3s. 11d. a day.

128. The conclusion seems consequently to be safely reached that the actual average wage per hand in the United States is about \$1, or 3s. 9d. a day, in a nominal working year of 300 days, for yarns and piece goods in general, and does not range more than 11 cents, or 5d. higher for plain fine colored work.

This conclusion does not, however, tally with the inferences to be drawn from the Table (quoted in the second following paragraph) prepared by Dr. Young for Mr. Commissioner Wells, in 1870. After allowing 10 per cent for decrease in wages since that date, his Table would show an average weekly earning of \$5 gold, or 20s. 10d. for operatives, omitting overseers. This average would seem to be rather too high to represent actual earnings, for, including overseers, the actual rate seems to be only \$6 currency, or 22s. 6d.

In comparing these wages with wages in England, it should be borne in mind that in the United States the weekly wages generally represent 66 hours of work against 60 hours in England. The actual average wage per hour in the United States is about 9 cents, or a small fraction (a quarter of a farthing) over 4d. The actual cost of labor per hour of work is of course somewhat higher.

Table showing the Average Rates of Wages paid to persons employed in the Cotton Mills of the several States in the Year 1869; also the Rates paid in Great Britain in 1866 as compared with the Average (gold) Rates in the United States in 1869.

Occupation.	Average Weekly Wages or Earnings in —								In Gold.			
	Maine.	New Hampshire.	Massachusetts.	Rhode Island.	Connecticut.	New York.	Pennsylvania.	Delaware.	General Average.	Average in United States in 1869.	Average in Great Britain in 1868.	Per cent. excess in U. States over Great Britain.
Carding —												
Overseer	\$21.50	\$18.08	\$23.40	\$17.00	\$16.60	\$15.00	\$26.00	\$12.00	\$18.08	\$13.87	\$7.97	\$74.08
Picker tenders	7.50	7.50	8.25	7.80	7.00	7.00	7.00	7.50	7.42	5.71	5.36	142.98
Railway tenders	6.50	4.57	4.28	3.50	4.00	4.00	...	...	4.02	3.09	1.92	61.45
Drawing frame tenders	4.00	4.41	4.44	5.00	4.66	4.00	...	4.20	4.25	3.27	2.75	18.91
Spreader tenders	6.75	6.65	6.50	6.12	6.00	6.50	...	4.72	6.41	4.16	2.75	51.37
Picker boy	8.50	4.35	6.80	6.25	4.00	8.00	...	3.70	4.78	3.68	2.35	56.59
Grinders	10.00	8.34	9.80	9.08	9.50	8.00	...	8.70	8.72	6.70	6.37	24.76
Strippers	7.25	7.37	7.70	9.50	7.00	6.00	7.00	7.92	7.23	5.56	4.26	30.51
Spinning —												
Overseer	22.00	16.38	21.00	15.00	17.50	15.00	16.00	20.00	17.50	13.46	7.42	81.40
Mule spinners	10.87	11.64	11.75	9.50	9.30	10.00	14.00	9.10	10.85	8.35	6.36	56.78
Mule backside pleasers	2.50	3.21	3.14	2.35	2.50	3.50	2.00	1.80	2.48	1.90	1.65	16.15
Frame spinners	4.40	5.20	6.75	5.00	3.25	3.50	...	3.13	3.53	2.70	2.37	13.92
Dressing —												
Overseer	20.00	17.60	21.00	13.75	16.50	13.50	...	...	16.37	11.75	...	...
Second hand	11.78	10.66	13.10	9.00	14.40	...	...	...	11.80	9.08	...	...
Spoolers	4.10	4.64	6.50	5.00	14.45	4.25	...	6.25	6.10	3.92	2.47	58.70
Warpers	5.50	5.51	6.10	5.75	4.68	...	...	3.75	4.49	3.46	3.85	10.13
Drawers and twistors	5.75	6.24	6.00	5.00	...	...	...	4.00	4.75	3.65	3.30	10.80
Dressers	11.10	11.43	14.00	11.25	11.80	...	...	...	14.10	10.35	...	...
Weaving —												
Overseer	21.00	16.53	22.20	16.25	16.00	15.00	16.00	...	16.25	12.50	10.00	25.00
Weavers	7.00	6.23	7.71	8.00	8.00	...	10.00	7.24	8.23	6.33	4.54	39.43
Drawing in hands	6.00	4.62	7.00	7.50	6.80	...	...	...	6.23	4.80	2.61	83.91
Repair shop, engine room, &c. —												
Foreman	23.00	16.87	28.66	18.00	17.00	16.00	11.00	15.00	16.23	11.70	...	...
Wood workers	14.25	12.96	16.30	16.00	16.25	...	...	15.00	14.98	11.52	7.42	55.37
Iron workers	13.18	12.13	16.27	13.16	11.75	10.50	...	...	12.72	9.79	7.43	31.94
Engineer	...	13.80	14.80	18.00	9.00	12.00	...	...	13.40	10.31	6.90	53.31
Labors	8.00	9.08	8.75	9.33	8.68	8.00	10.00	8.25	8.87	6.82	4.50	51.55
Overseer in cloth room	17.50	11.67	17.75	15.00	11.00	12.00	12.50	9.00	12.13	9.37	...	...

NOTE. — Hours of labor per week in the United States (generally), 66; in Great Britain, 60. Average excess of wages paid in the cotton mills of the United States in 1869 (gold) over the rates in Great Britain, 39.9 per cent. Omitting overseers, the average weekly earnings of operatives in the cotton mills of the United States in 1869 was \$6.56 gold, and in Great Britain \$4.59.

129. In treating of wages in each department, I purpose first to reproduce *in extenso* Dr. Young's interesting Table, as prepared for Commissioner Wells, and republished in his Special Report on Immigration. Wages by department and classes. In 1869.

The comparison made in the note to the above Table has been already noticed. (*Vide* paragraphs 27 and 128.)

According to this Table, the wages range on an average 6 per cent higher in the New England States than in the Middle States. This accords on the whole with the results stated in the preceding paragraphs respecting average wages of all hands. In New England, in Middle States.

The average decrease of wages for all hands, except overseers, is usually stated at 10 per cent since 1869. Consequently the following rates of wages for 1872 may be deduced from Dr. Young's Table:— Decrease since 1869.

Average Weekly Earnings.

Estimated wages in 1872.

	Dol. cts.	£	s.	d.
Carding:—				
Overseer	18 08	8	7	8
Scutcher hand	6 68	1	5	0½
Railway minders	8 60	0	18	6
Drawing frame	8 83	0	14	4½
Speeder	4 87	0	18	8
Scutcher boy	4 80	0	16	1½
Grinders	7 85	1	9	5½
Strippers	6 60	1	4	4½
Spinning:—				
Overseer	17 50	8	5	7½
Mule spinners	9 77	1	16	7½
Mule backside piecers	2 22	0	8	4½
Frame spinners	8 17	0	11	7½
Dressing:—				
Overseer	15 27	2	17	8
Second hand	10 62	1	18	10
Spoolers	4 59	0	17	2½
Warpers	4 04	0	15	1½
Drawers and twistors	4 28	0	16	0½
Dressers	12 70	2	7	7½
Weaving:—				
Overseer	14 68	2	14	10½
Weavers	7 40	1	7	9
Drawers-in	5 60	1	1	0
Other hands:—				
Foremen	15 22	2	17	1
Wood workers	13 48	2	10	6½
Iron workers	11 45	2	2	11½
Engineer	12 06	2	5	2½
Laborers	8 00	1	10	0
Overseer in cloth room	12 18	2	5	7½

Some of the above averages are less valuable than others, inasmuch as from some States, such as Pennsylvania for instance, the returns are meagre, as will be seen on referring to the Table for 1869.

In making further inquiry into wages, I shall take separately the carding, spinning, dressing, and weaving departments.

In blowing and carding-rooms. 130. In New England the following are some rates of wages paid last year and at the present time for carding hands in a fine mill : —

Rates in a fine mill.	Carding room :—	Del. etc.	£ s. d.		
	Overseer	18 00	8	7	6
	Second hand	12 00	2	5	0
	Spreader, or scutcher, or third	9 00	1	13	9
	Opener minder	4 00	0	15	0
	Spreader minder	5 00	0	18	9
	Railway minder	4 50	0	16	10½
	Drawing-frame minder	4 00	0	15	0
	Speeder minder	8 00	1	10	0
	Grinder	10 50	1	19	4½
	Carders (at self-strippers), men	8 50	1	11	10½
	Rover (intermediate) minder	7 50	1	8	1½
	Fly-frame minder	7 50	1	8	1½
	Helper at all places	9 00	1	13	9

Actual earnings in 8 mills (various) 1870. The above are rates in a well-organized fine mill. The following, on the other hand, are average rates, taking mills of all kinds, as stated in the first column : —

Cotton operatives in carding and blowing rooms.		Earnings for six months.			Estimated year's earnings.
No.	Occupations.	Highest.	Lowest.	Average	
17	Overseers	\$618.00	\$374.37	\$496.18	\$992.36
21	Second hands	861.00	257.81	309.15	618.30
20	Third hands	288.00	174.80	228.65	457.30
75	Picker tenders	232.00	148.50	187.75	375.50
50	Railway tenders	147.00	98.81	122.90	225.80
	Children	75.40	50.00	62.70	125.40
4	Slubber tenders	111.00	109.00	110.00	
81	Drawing-frame tenders	116.00	85.57	100.78	201.56
8	Fly-frame tenders	184.00	100.00	117.00	
302	Speeder tenders	185.00	119.25	152.11	304.22
17	Picker boys	154.30	115.00	134.50	269.00
4	Card boys	60.00	50.00	55.00	110.00
71	Grinders	286.00	209.30	247.65	495.30
104	Strippers	215.00	148.18	181.59	363.18
8	Card tenders	186.00	175.00	180.50	361.00
8	Sweepers	78.00	47.00	62.50	125.00
64	Other hands	155.00	77.00	116.00	232.00

This Table shows, taking a nominal year of 300 working days, or 50 working weeks of 6 days each, the following ranges and averages of actual weekly wage for each class of hand :—

Carding room.	Actual wages.			
	Range from —		Average.	
Overseer	\$15.00 to	\$25.00	\$20.00	£8 15s. 0d.
Second hand	10.80	14.50	12.40	2 2 6
Third hand	7.00	11.80	9.15	1 14 8½
Scutcher minder	5.75	9.80	7.50	1 8 1½
Railway minder	8.90	5.90	4.90	0 18 4½
" children	2.00	8.00	2.50	0 9 4½
Slubber minder	4.85	4.45	4.40	0 18 6
Drawing-frame minder	8.45	4.65	4.00	0 16 0
Fly-frame minder	4.00	5.35	4.70	0 17 7½
Speeder	4.75	7.40	6.00	1 2 6
Scutcher boy	4.60	6.20	5.40	1 0 8
Card boy	2.00	2.40	2.20	0 8 8
Grinder	8.40	11.50	10.00	1 17 6
Stripper	6.00	8.80	7.15	1 6 9½
Card-minder	7.00	7.50	7.25	1 7 2½
Sweeper	1.50	8.20	2.40	0 9 0
Other hands	8.10	6.20	4.65	0 17 5½

I have been able to meet with a few isolated statements respecting certain classes of hands, which tend to confirm the range, but rather to alter the average in the above Table, such as of third hands earning \$550 a year, or \$11 a week, and grinders \$474 a year, or \$9½ a week. It will be noticed that some of these averages are not as good guides to the facts as are the others, for there are not hands enough in some classes with which to obtain an approximately fair average. The average weekly rates of wage in the fine mill differ, as was to be expected in some classes, from the actual weekly wage in the foregoing Table. Likewise Dr. Young's Table differs somewhat, but in some instances the difference is more apparent than real. Thus the average of railway minders, men and children, is the same in both statements. On the whole, however, Dr. Young's Table as calculated by me for 1872 shows rather lower wages than the above statement shows for Massachusetts, but not lower wages than might be caused by the lesser wages of the northern part of New England and of the Middle States. Moreover, if the column for Massachusetts in Dr. Young's Table for 1869 be compared, after deducting 10 per cent, with the corresponding items

in the statement of actual wages, the coincidence is remarkable, for in respect of the grinders alone is there any greater difference than a few cents.

Daily rates in 38 Massachusetts mills, 1870. In Massachusetts in 1871, returns, representing 1870-71, and being nearly complete for 38 mills, were made of the average daily rate of wage in each department, distinguishing only between overseers and other hands. From these I have made the following statement, to show the range and average for the carding-room : —

Carding and blowing room.	Range from —	General average.	
Overseers	\$1.66½ to \$6.00	\$2.90	10s. 10½d.
Men		1.55	5 9½
Women	1.18 2.75	0.97	3 7½
Young persons		0.74	2 9½
Children	0.74 1.20	0.60	2 3
Average of these five classes	— 0.50	1.33	5 0½

The average daily pay per hand in any given card-room is, of course, different from this average daily rate of wage in carding departments. If the general average for men be proportionately increased so as to include the wage of the overseer, the general averages for carding hands do not materially differ from those for all hands in paragraph 126. Moreover, if 10 per cent be deducted from a return of 1869, the wages of men would average \$1.26, of women 86 cents, and children 60 cents, and the averages would be lower.

Number of hands in carding department. It is desirable, in order to understand how far the saving of labor has been carried in each department, to know the number of hands required for a given amount of work. In a fine mill in New England, the following is a list of hands per 10,000 spindles, mule spinning, with which I have been most obligingly furnished : —

Blowing room : —

Opener boy	1
First lapper	1
Second lapper	1

Carding room : —

Overseer	1
Second hand	1
Grinder	1
Stripper	1
Sweeper	1
Helper, oiler, &c.	1

Girl at railway and first drawing	1
„ second drawing	1
„ slubbers	1
„ intermediate frames	2
„ fine speeders	6
Girl as sweeper	1
Total hands, or $2\frac{1}{10}$ per 1,000 spindles	21

In the eight establishments in Massachusetts, of which the statistics have been quoted, there were returned for the blowing and carding rooms 831 hands. On the assumption that these establishments represented about 850,000 spindles, this would give $2\frac{1}{10}$ per 1,000 spindles. Perhaps it would, for the best districts, be fair to take these rates as indicating the range of the ratio of labor to machinery in this department.

182. In the spinning department I can quote from similar sources, and in the same order, the following statements of wages :—

Wages in
spinning
department

Statement of Rates of Wages in Fine Mill.

Rates in
fine mill.

	Dols. etc.	£ s. d.
Spinning department :—		
Overseers	18 00	8 7 6
Assistant	12 00	2 5 0
Spinners (14 mills per lb.), who pay back		
boys	2 50	0 9 4½
Sweeper boy	2 50	0 9 4½

*Statement of Actual Earnings.**

Actual
earnings in
8 mills
(various).

Spinning department.		Earnings for six months.			Estimated year's earnings.
No.	Occupation.	Highest.	Lowest.	Average.	
18	Overseers	\$552.00	\$329.81	\$440.80	\$881.60
27	Second hands	868.00	258.60	305.80	611.60
24	Third hands	277.00	156.00	216.50	433.00
21	Section hands	289.00	100.00	184.50	368.00
124	Mule spinners	884.00	106.00	235.00	470.00
106	{ Doffers	186.00	94.17	140.08	280.16
	{ Children	69.00	60.00	64.50	129.00
147	Mule backside piecers	109.00	80.00	69.50	139.00
623	{ Frame spinners	160.00	104.17	132.58	265.16
	{ Children	85.75	80.00	67.87	135.74
18	Sweepers	60.00	47.00	53.50	107.00
82	Other hands	155.00	77.00	116.00	232.00

This Table shows the following ranges and averages of actual weekly wage for each class of hand:—

Spinning room.	Range from —		Average.		
				£	s. Od.
Overseers	\$18.20 to \$22.00		\$17.60	£8	6s. 0d.
Second hands	10.10 14.80		12.20	2	5 9
Third hands	6.20 11.10		8.65	1	12 5½
Section hands	4.00 10.80		7.40	1	7 9
Mule spinners	4.20 14.50		9.40	1	15 8
Doffers	8.80 7.40		5.60	1	1 0
„ children	2.40 2.75		2.60	0	9 9
Mule backside pressers . .	1.20 4.85		2.80	0	10 6
Frame spinners	4.20 6.40		5.80	0	19 10½
„ children	1.20 3.45		2.85	0	8 9½
Sweepers	1.50 2.40		1.95	0	7 8½
Other hands	3.10 6.20		4.65	0	17 5½

As compared with Dr. Young's Tables, as altered for 1871-72, these results do not vary more than might be expected. As compared with his column for Massachusetts, the actual earnings of mule spinners and frame spinners average less than in his Table, after due deduction of the 10 per cent.

Other statements.

I have been able to meet with a few isolated statements as follows respecting certain classes of hands. According to the statistics cited during the Fall River strike in 1870, it would seem that spinners can now earn an average of \$2, or 7s. 6d. a day, at a pay of 4 cents per 100 hanks. This rate is said to give a daily wage higher (by 10 to 20 per cent) than at other places, because the better class of mills attracts a better class of operatives, and plant and hands both work better. Another statement shows spinners earning \$525 a year, or from \$10½ to \$11 a week, which is about \$1.75, or 6s. 6¾d. a day of eleven hours. This would tend to confirm the Fall River allegation of higher wage there. Other statements show earnings of \$12 to \$18, or 45s. to 48s. 9d. a week by mule spinners, of \$7, or 26s. 3d. a day, or \$20 a month for girls of 17 at ring spinning. A girl piecing at throstle frames will earn \$5, or 18s. 9d. a week, the pay being \$1½, or 4s. 8½d. a side. Boys in the spinning-room can earn from \$4 to \$6, or 15s. to 22s. 6d. a week, or 60 cents (2s. 3d.) to \$1 (3s. 9d.) a day. According to the statement of piece-work in the following paragraph, back boys, however, receive, in different localities, only \$1.75 to \$3.60, or 6s. 6¾d. to 11s. 3d. a week. In the Philadelphia district, the rates of spin-

ners' wages range from \$1.75 to \$2.25, or 6s. 6½d. to 8s. 5½d. a day, Piece prices rarely to a higher rate. Piece prices in spinning.

183. Two men in the Fall River strike gave a report, obtained by personal visits to the localities, to their committee on the prices paid for spinning.

"The following is a correct list of prices paid for spinning yarn, from No. 35 to No. 38, in the various places in New England:—

Weft, 85s. — Price paid to spinners for spinning 100 lbs. of yarn in	
Fall River	\$1.88½
Back boy receives \$1.75 per week.	
Weft, 86s. — Price paid to spinners for spinning 100 lbs. of yarn in	
Lawrence	1.80
Back boy receives \$3 per week.	
Weft, 88s. — Price paid to spinners for spinning 100 lbs. of yarn in	
Lowell	1.80
Back boy receives \$3 per week.	
Weft, 86s. — Price paid to spinners for spinning 100 lbs. of yarn in	
Manchester, N.H.	1.95
Back boy receives \$3 per week.	
Weft, 85s. — Price paid to spinners for spinning 100 lbs. of yarn in	
Sprague's Mills, R.I.	1.44
Back boy receives \$2.50 per week.	
Average rents at Sprague's firms, R.I., \$35 per year, with better accommo-	
dation than at Fall River at \$96."	

The reduced price in Fall River, which caused the strike, was 4 cents (according to above report only .039) or about 1½d. per 100 hanks (35s.), a reduction of 8 per cent from the previous price of .043½. The price now paid in Rhode Island in a fine mill (33s.) for both warp and weft is .014, or .063 of a penny per lb., mule spinning, and the price for warp throstle (ring) spinning is stated to be .105, or 4½d. per 100 hanks of 24s.

The general range and average of daily rates of wage in the spinning department were in 1871:—

General
range and
average
(1871) of
the 38 mills.

	Range from —		Average.	
Overseers	\$1.75	\$6.00	\$2.87½	10s. 9d.
Men	0.90	2.75	1.40	5 3
Women	0.68	1.17	0.94	3 6½
Young persons	0.51	1.00	0.87	3 3
Children	0.26	0.88½	0.50	1 10½
Average of other five classes			\$1.32	4s. 10½d.

If the deduction of 10 per cent be made from a return in 1869, the average daily rates for the present time would seem to be \$1.28 for men, 90 cents for women, and 45 cents for children, which are considerably lower than is the average.

Number of hands. 134. As to the number of hands in a spinning department, the following particulars can be stated from the same sources as in the carding department.

In the fine mill of 10,000 spindles there are:—

	Hands.
Overseer	1
Second hand	1
Mill spinners	8
Back boys	8
Sweeper boy	1
Total	19
Or $1\frac{2}{11}$ per 1,000 spindles.	

In the eight establishments, there were in all 1,090 hands (half employed in frame spinning), or three per 1,000 spindles. The ratio of labor to machinery may be, perhaps, taken to range between these two rates. It should be remarked, however, that in the fine mill the overseer and second hand have also the oversight of the preparation for weaving, and the sweeper boy helps in all those rooms.

135. For the dressing room similar statements can be given.

Wages in
the dress-
ing-room.

Rates in
fine mill.

Statement of Rates of Wage in Fine Mill, 1871-73.

	Dols. cts.	£	s.	d.
Dressing Department:—				
Overseer	18 00	8	7	6
Assistant	12 00	2	5	0
Spoolers, girls (7 mills per lb.)				
Warper minders	7 00	1	6	8
Sweeper boy	2 50	0	9	$4\frac{1}{2}$
Dressers, men	15 00	2	16	8

*Statement of Actual Earnings.*Actual
earnings in
8 mills.

Dressing room.		Earnings for six months.			Estimated year's earnings.
No.	Occupation.	Highest.	Lowest.	Average.	
18	Overseers	\$546.00	\$881.00	\$488.50	\$877.00
17	Second hand	827.00	214.17	270.58	541.16
18	Third hands	277.00	166.00	216.50	432.00
20	Section hands	281.00	110.00	170.50	840.00
228	Spoolers	168.40	50.00	106.50	218.00
124	Warpers and reelers	209.00	77.00	143.00	286.00
24	Drawers and twisters	175.00	108.00	141.50	283.00
104	Drawing-in hands	287.88	81.00	159.19	318.88
87	Dressers	565.00	180.00	\$72.50	745.00
9	Beamers	240.50	218.25	229.87	458.74
1	Slasher tender	867.50		867.50	734.00
8	Other hands	116.00		116.00	232.00

This Table shows the following ranges and averages of actual weekly wage for each class of hand :—

Dressing room.	Range.		Average.	
Overseers	\$18.20 to	\$21.80	\$17.50	£3 5s. 7½d.
Second hands	8.60	13.10	10.85	2 0 8½
Third hands	6.20	11.10	8.65	1 12 5½
Section hands	4.40	9.20	6.80	1 5 6
Spoolers	2.00	6.55	4.25	15 11½
Warpers and reelers	3.10	8.30	5.70	1 1 4½
Drawers and twisters	4.80	7.00	5.65	1 1 2½
Drawing-in hands	3.20	9.50	6.35	1 18 9½
Dressers	7.20	22.60	14.90	2 15 10½
Beamers	3.75	9.60	9.20	1 14 6
Slasher tender		14.70	14.70	2 15 11½
Other hands		4.65	4.65	17 5½

These results vary somewhat from those obtained for Massachusetts from Dr. Young's Table, after deducting the 10 per cent; the more skilled ranging rather higher, and the less skilled rather lower. They vary rather more from his general averages.

The labor in the dressing room is somewhat trying, and hence the difference between the actual earnings and daily rates is more marked in respect of these classes of operatives than of perhaps any other. A dresser earning \$16 a week returned himself as only able to earn \$50 a month. A girl of fifteen, as dressing hander, with

\$3.06 a week only earned \$8 a month. A youth, as drawer and twister, at \$8 a week earned about \$25 a month. Many dresser tenders in all districts seem to earn from \$13 to \$14 a week. In the Philadelphia district, spoolers and others (women) are paid a daily rate of 75 cents to \$2, or 2s. 9½d. to 7s. 6d. At the new warping mill, one skilled man and two boys earned \$75 in one month for 21,000 lbs. of linked warp. This gives .086 per lb. Women warpers average \$9, or 1l. 13s. 9d.

Piece
prices in
dressing,
&c.

186. The pay for piece-work is, in a fine mill:—

	cts.	s.	d.
For drawing, per beam (100 by 100) of 14 cuts . . .	75	or 2	9½
For drawing, per beam (64 by 64) of 28 cuts . . .	87½	1	5

And in general on printers (64 by 64) 28 inches wide:—

	s.	m.	s.	d.
For spooling, per lb.	00	9	or 0	0.405
Warping, per beam	38	0	1	5.1
Drawing in, per beam	38	0	1	2.85
Dressing, per 47 yards	4	5	0	2.025

The aggregate pay for preparation in the dressing-room is, on printers, 64's, from 5 to 10 cents, or from 2½d. to 4½d. per cut of 47 yards, and on sheeting, 100's, in proportion.

General
range and
average of
wages.

The general ranges and averages of daily rates of wage in the dressing department in 1871 is as follows:—

Daily Rates of Wage.

Dressing room.	Rank.	Average.	
Overseers	\$1.75 to \$4.25	\$2.98	10s. 11d.
Men	1.81 2.50	1.90	7 1½
Women	75 1.65	1.10	4 1½
Young persons	45 1.47	0.87	8 1
Average of the four classes	—	1.70	6 4½

These averages range much higher than in other departments, as was to be expected.

Number of
hands.

187. The number of hands in this department is very variable. In the fine mill referred to in the other departments there would be:—

	Hands.
Spoolers, girls	5
Warper minders, girls	3
Dressers, men	3
Drawers-in of webs	3
Total	14
Or $1\frac{1}{2}$ per 1,000 spindles.	

In the eight establishments the returns show a total of 642 hands, or $1\frac{1}{2}$ per 1,000 spindles. These rates indicate the ratio of labor to machinery.

138. The weaving department can be similarly treated.

Wages in
weaving
depart-
ments.

Statement of Rates of Wages, Fine Mill, 1872-73.

Rates in a
fine mill.

	Dols. cts.	£ s. d.
Weaving Room :—		
Overseer	18 00	3 7 6
Assistant	12 00	2 5 0
Weavers, 4 looms each, 6 to 7 mills per yards		
Helpers	8 00	1 10 0
Oilers for looms and shafting	6 00	1 2 6
Smash piecers	6 00	1 2 6
Trimmers	5 00	18 9

Statement of Actual Earnings.

Actual
earnings in
8 mills.

Weaving room.		Earnings for six months.			Estimated year's earnings.
No.		Highest.	Lowest.	Average.	
18	Overseers	\$546.00	\$379.26	\$462.68	\$925.26
32	Second hands	378.75	269.50	324.12	648.24
42	Third hands	279.00	164.00	221.50	443.00
48	Room girls	284.00	89.00	162.50	325.00
54	Cloth girls	202.00	175.00	187.50	375.00
1,721	Weavers	251.00	68.00	207.00	414.00
88	Other hands	180.00	77.00	128.50	256.00

This Table shows the following ranges and averages of actual weekly wage for each class of hand:—

Weaving room.	Range.	Average.		
			£s.	9s. 4½d.
Overseers	\$15.20 to \$21.80	\$18.50	2	8 9
Second hands	10.80 15.15	18.00	1	18 4
Third hands	6.56 11.16	8.90	1	4 4½
Room girls	3.56 9.88	6.50	1	8 1½
Cloth girls	7.00 8.10	7.50	1	10 11½
Weavers	2.50 14.00	8.25	19	8½
Other hands	3.10 7.20	5.15		

The weavers are 15 per cent higher than in Dr. Young's Table, as altered for 1872.

Other statements. Isolated statements as to daily rates and actual earnings tend, so far as they go, to confirm the general impression obtained from the statistics of the foregoing Tables. In the Philadelphia district, for instance, loom "bosses" (overseers) are paid \$3 to \$4, or 11s. 3d. to 15s.; weavers (men) are paid for piece-work from \$2½ to \$5, or 9s. 4½d. to 18s. 9d. a day, and weavers (women) from \$1.50 to \$2.30, or 5s. 7½d. to 8s. 7½d. The higher rates are rare, and the bulk of the weaving is done at the lower price, and chiefly by women. In the Fall River strike an intelligent agent of one of the mills, although he quoted instances of higher earnings, took the actual average weekly wage of the weaver at \$9, or 17. 13s. 9d. In Connecticut, women weavers earn from 75 cents to \$1.25 a day; in Lowell, Massachusetts, \$1.20 a day.

Piece prices. 139. The prices for piece-work are stated as follows in the course of the testimony in the Fall River strike:—

	Cents.
In Providence per cut	25
Taunton „	25½
Fall River „	27

To these rates a note by the Massachusetts Bureau of Labor was appended, stating the prices as follows:—

	Yards.	Cents.	Per yard.	
			Mills.	d.
Fall River	45	27	6	0.27
Taunton (Eagle Mills)	46	25½	5½	0.25
„ (Dean Mills)	40	24½	6½	0.28
Providence (Oriental)	40	28	7	0.32
„ (Steam)	52	38	7½	0.38

These prices were all for weaving print cloth, 64 by 64. The average is $6\frac{3}{4}$ mills, or $0.29d.$, per yard.

Another statement gives the price of weaving, inclusive of preparation for weaving, as follows:—

		c.	c.	s.	d.	s.	d.
64 by 64 print cloth, 47 yards at 80 to 85	=	1	1	1	1	1	1
100 100 sheeting, 42 $\frac{1}{2}$ „		85	160	8	2	8	9

The general wages and averages of daily rates of wage in 1871 for the weaving department were as follows:—

General
range and
average.

Weaving room.	Range.	Average.	
Overseers	\$2.25 to \$5.25	\$3.00	11s. 8d.
Men	1.00 2.50	1.75	6 6 $\frac{1}{2}$
Women	80 1.60	1.18	4 5
Young persons	70 1.88	1.10	4 1 $\frac{1}{2}$
Average of the four classes	— —	1.77	6 7 $\frac{1}{2}$

140. The number of hands varies, of course, with the nature of the manufacture. In the fine sheeting mill already quoted there would be no separate cloth-room under separate oversight. Its hands would, therefore, be counted in the weaving department. The list would be as follows:—

Overseer	1
Second hand	1
Weavers	52
Helpers	2
Oiler	1
Smash piecer	1
Trimmers	5
Total	63

Or $6\frac{1}{18}$ per 1,000 spindles.

In the eight establishments the rate is slightly over 6 per 1,000 spindles.

141. Of other wages in mills for white work, the following statements may be made:—

Wages in
other parts
of mill.

Actual
earnings in
8 mills.

Statements of Actual Earnings.

		Highest.	Lowest.	Average.	Year's earning.
In cloth room.	Cloth room :—				
	7 Overseers	\$468.00	\$286.00	\$377.00	\$754.00
	5 Second hands	810.00	269.00	289.00	579.00
	101 Other hands	264.25	62.00	168.12	326.24
	44 Folders and trimmers	196.00	68.50	129.25	258.50
In repair shop, &c.	Repair shop and general labor :—				
	6 Foremen	675.00	450.00	562.50	1,125.00
	72 Carpenters	452.61	155.00	303.80	607.60
	74 Machinists	506.00	190.20	348.10	696.20
	8 Engineers	397.00	265.00	331.00	662.00
	11 Firemen	308.00	235.00	271.50	543.00
	7 Overseers of yard	489.16	280.00	384.50	769.00
	108 Laborers	386.41	187.00	261.70	523.00
	47 Watchmen	385.00	136.00	235.00	470.00
	19 Painters	400.42	155.00	277.71	555.42
	2 Masons	269.00	—	269.00	538.00
	2 Belt-makers	840.00	302.00	521.00	1,042.00
	1 Wheel-tender	332.29	—	332.29	664.58

This Table gives the following ranges and averages of actual weekly wages for each class of hand:—

Actual Weekly Wage.

	Actual weekly average.			
	Range from —		Average.	
Cloth room :—				
Overseer	\$11.45 to \$18.75		\$15.10 = £2 16s. 7½d.	
Second hand	10.80 12.40		11.60 2 8 6	
Other hands	2.50 10.60		6.55 1 4 6½	
Folders and trimmers	2.60 7.80		5.20 0 19 6	
Repair shop and general labor :—				
Foremen	18.00 27.00		22.50 4 4 4½	
Carpenters	6.20 18.10		12.15 2 15 6½	
Machinists	7.60 20.20		13.90 2 12 1½	
Engineers	10.60 15.90		13.25 2 9 8½	
Firemen	9.40 12.80		10.85 2 0 8½	
Overseers of yard	9.20 17.60		13.40 2 10 8	
Laborers	7.50 18.45		10.50 1 19 4½	
Watchmen	5.45 18.40		9.40 1 15 8	
Painters	6.20 16.00		11.10 2 1 7½	
Masons	— 10.80		10.80 2 0 6	
Belt-makers	12.00 18.60		12.80 2 8 8	
Wheel-tender	— 18.30		18.30 2 9 10½	

So far as these results admit of comparison with Dr. Young's Table as altered for 1872-73, they are considerably higher than the general averages for the United States, but do not vary materially from those for Massachusetts.

Other data give the following rates of weekly wage : —

Other data.

Porters . . .	\$10.00	. .	£1	17s.	6d.
Watchmen . .	10.50	. .	1	19	4½
Engine-men .	18.00	. .	8	7	6
Machinists .	14.40	. .	2	14	0
" . .	12 to 18	. .	2	5	0 to £8 7s. 6d.
Laborers . .	8 to 10	. .	1	10	0 to 1 17 6

The general range and averages of daily rates of wage are as follows : —

General range and average.

CLOTH ROOM.

				Average.
Overseers . . .	from \$1.07 to \$3.50	. . .	\$2.57	= 9s. 7½d.
Men	" 1.00 1.88	. . .	1.40	5 8
Women	" 0.83½ 1.50	. . .	1.07	4 0
Young persons .	" 0.50 1.28	. . .	0.96	8 7
General average of the four classes . .				1.50 4 7½

REPAIR SHOP, &c.

Overseers . . .	from \$2.87 to \$4.50	. . .	\$3.25	= 12s. 2½d.
Men	" 1.24 3.00	. . .	2.00	7 6
General average of the four classes . .				2.62 9 10

The higher rates for men in the repair shop are when there is no foreman returned. In other cases it is extremely rare for the rate to be more than \$2. This, however, raises the average rate for men in the repair shop.

142. The number of hands in these departments is naturally even more variable than in any other, and cannot be given with any accuracy from the data I have before me. In the establishments so often cited they were about 1½ per 1,000 spindles.

The wages of overseers vary according to the size of the room which they overlook, and also somewhat according to locality. The range is large in all the departments. Perhaps the fact that, in a 10,000 spindle fine mill in New England the overseers receive \$18, or 3l. 7s. 6d., and the assistants \$12, or 2l. 5s., a week, may be taken as a standard. The usual range in New England

is from \$2.75 to \$4.50 a day for the same sized rooms as in 1840 at from \$1.50 to \$2 a day. In the Philadelphia district good overseers are stated to cost \$24, or 4*l.* 10*s.* a week.

Of superin- The superintendent or manager of a mill is paid from \$1,750 to tendent. \$2,000, or 329*l.* 12*s.* 6*d.* to 375*l.* a year. In the corporation mills the management of the mill is shared by the treasurer for the financial part, and by the manager for the manufacturing part. These officers often receive high salaries, such as \$10,000 to \$12,000, or 1,875*l.* or 2,250*l.*, and even more in some gigantic enterprises which distinguish New England.

Daily rates 143. As regard the daily rates of wage which are paid in mills in 1872 in making certain classes of goods, I have been able to compile the print cloth. following Table : —

Daily Rates of Wage for certain Cotton Fabrics.

PRINT CLOTH.

	Overseers.	Men.		Women.		Children.	
Carding 1 . . .	\$3.00	\$0.80 to \$2.20		\$0.60 to \$1.15		. . . to . . .	
2 . . .	3.00	1.00	2.25	0.80	1.00	\$0.50 to \$0.70	
3 . . .	. . .	1.20	1.40	0.70	1.00	0.50	0.60
4 . . .	2.75	1.20	2.00	0.70	1.00	0.80	0.50
5 . . .	3.50	1.00	2.00	0.65	1.00	. . .	. . .
Average . .	6.06	1.06	1.98	0.69	1.03	0.44	0.60
Spinning 1 . . .	3.00	0.90	2.00	. . .	. . .	0.30	0.60
2 . . .	2.50	1.50	2.20	0.75	1.10	0.45	0.75
3 . . .	. . .	1.00	1.65	0.60	1.00	0.30	0.70
4 . . .	2.75	1.10	2.00	0.65	1.40	0.30	0.75
5 . . .	3.50	1.20	2.10	0.70	1.10	. . .	. . .
Average . .	2.94	1.15	2.00	0.68	1.15	0.34	0.70
Dressing 1 . . .	5.00	1.00	2.30	1.00	1.25	0.40	0.50
2 . . .	. . .	1.10	2.30	1.00	1.40	0.60	0.80
3 . . .	. . .	1.00	2.00	1.00	1.30	. . .	. . .
4 . . .	. . .	1.20	2.20	0.80	1.20	0.60	1.00
5 . . .	3.50	1.00	2.40	1.00	1.20	. . .	. . .
Average . .	3.25	1.06	2.25	0.98	1.27	0.54	0.77
Weaving 1 . . .	3.00	1.00	2.10	1.00	1.20	. . .	. . .
2 . . .	3.00	1.60	2.20	1.00	1.30	0.50	0.80
3 . . .	. . .	1.00	1.50	1.10	1.30	. . .	. . .
4 . . .	3.00	1.50	2.00	0.90	1.20	0.50	1.00
5 . . .	3.50	1.20	2.00	0.85	1.10	. . .	. . .
Average . .	3.13	1.26	1.96	0.97	1.22	0.50	0.90

PRINT CLOTH AND SHEETINGS AND THE LIKE.

In print
cloth, sheet-
ings, &c.

	Overseers.	Men.		Women.		Children.	
Carding 6 . . .	\$4.50	\$0.90	\$2.20	\$0.60	\$1.10	\$0.80	\$0.50*
7 . . .	8.25	1.20	2.10	0.70	1.20	0.40	0.85*
8 . . .	4.00	1.00	2.20	0.70	1.10	0.40	0.50*
9 . . .	8.00	0.90	2.20	0.50	0.90	0.45	0.60†
10 . . .	2.75	0.80	2.20	0.60	0.90	0.30	0.75‡
Average . .	3.84	0.96	2.18	0.62	1.04	0.37	0.64
Spinning 6 . . .	4.00	0.60	2.10	0.60	1.10	0.20	0.50
7 . . .	8.25	1.10	2.00	0.80	1.25	0.50	0.70
8 . . .	3.50	0.90	2.10	0.60	0.80	0.40	0.50
9 . . .	8.00	0.90	2.00	0.60	0.85	0.30	0.45
10 . . .	2.75	0.60	2.20	. . .	. . .	0.30	0.40
Average . .	3.80	0.82	2.08	0.65	1.00	0.34	0.51
Dressing 6 . . .	4.00	1.10	2.30	0.60	0.70	. . .	. . .
7 . . .	. . .	1.15	2.20	0.70	1.00	. . .	. . .
8 . . .	3.00	1.10	2.20	0.60	0.90	0.45	0.60
9 . . .	3.00	1.25	2.25	0.85	0.90	0.35	0.45
10 . . .	. . .	1.10	2.30	0.60	0.80	. . .	. . .
Average . .	3.84	1.14	2.25	0.67	0.86	0.40	0.53
Weaving 6 . . .	4.00	1.10	2.30	0.60	1.30	. . .	. . .
7 . . .	8.25	1.30	2.20	0.80	1.60	. . .	. . .
8 . . .	3.50	0.90	2.10	0.60	1.20	0.40	0.50
9 . . .	3.50	0.90	2.20	0.70	1.00	. . .	. . .
10 . . .	2.75	1.00	2.30	0.60	1.30	. . .	. . .
Average . .	3.40	1.04	2.20	0.66	1.28	0.40	0.50

GINGHAM AND VARIOUS FABRICS.

In ging-
hams, and
mills of
many vari-
ous pro-
ducts.

Carding 11 . . .	2.50	0.90	2.00	0.70	1.00	0.45	0.70§
12 . . .	3.25	1.00	2.20	0.70	1.10	. . .	. . .
13 . . .	. . .	1.00	2.00	0.70	1.00	0.65	0.70
14 . . .	2.75	1.00	2.00	0.70	0.90	0.40	0.70
15 . . .	2.75	0.90	2.10	0.45	0.65	0.35	0.55
16 . . .	3.00	1.10	2.10	0.60	0.90	. . .	. . .
17 . . .	3.00	0.60	1.90	0.50	0.80	. . .	. . .
18 . . .	3.50	0.90	1.80	0.50	0.85	0.45	0.50
Average . .	3.07	0.93	2.00	0.60	0.90	0.46	0.63
Spinning 11 . . .	2.75	0.75	2.00	0.60	0.90	0.50	0.60
12 . . .	3.00	0.90	1.90	0.55	1.00	. . .	. . .
13 . . .	. . .	0.90	1.90	0.70	1.00	0.45	0.55
14 . . .	2.75	1.00	2.00	0.70	0.90	0.40	0.70
15 . . .	2.75	0.90	2.00	0.45	0.65	0.40	0.55
16 . . .	3.00	1.00	2.30	0.60	1.00	0.40	0.50
17 . . .	3.00	0.50	2.00	0.35	1.40	. . .	. . .
18 . . .	3.50	0.70	1.70	0.75	0.90	0.45	0.60
Average . .	2.97	0.83	1.96	0.60	1.07	0.43	0.58

* Prints and Shirtings. † Sheetings and the like. ‡ Fine sheetings. § Gingham, &c.
 ¶ Various. †† No distinction as to children.

GINGHAMS AND VARIOUS FABRICS, — *continued.*

	Overseers.	Men.		Women.		Children.	
Dressing 11 . . .	...	1.20	2.10	0.80	0.90	...	...
12 . . .	3.25	1.00	2.00	0.75	1.00	0.45	0.60
13 . . .	...	0.80	2.00	0.80	1.80	...	...
14 . . .	2.50	1.10	1.90	0.80	1.20	0.40	0.70
15 . . .	...	1.10	1.80	...	...	...	...
16 . . .	3.00	1.10	2.00	...	...	...	...
17 . . .	3.00	1.20	2.10	0.60	1.80	...	...
18 . . .	3.50	1.20	1.60	...	...	...	...
Average . .	3.05	1.08	1.94	0.75	1.24	0.43	0.65
Weaving 11 . . .	2.75	1.10	2.20	1.00	1.10	0.60	0.70
12 . . .	3.25	1.80	2.80	0.50	1.00	...	...
13 . . .	...	0.90	2.00	0.75	1.80	...	...
14 . . .	3.00	1.10	2.00	0.90	1.10	...	...
15 . . .	...	1.10	2.10	0.50	0.60	0.40	0.50
16 . . .	3.50	1.20	2.20	0.45	1.10	...	...
17 . . .	3.00	1.20	2.10	0.60	1.10	...	...
18 . . .	...	1.20	1.75	1.00	1.60	...	...
Average . .	3.16	1.14	2.08	0.70	1.10	0.50	0.60

Averages
by depart-
ment.

If the averages from the foregoing Table be grouped according to departments, the following statement will show the general average for all the eighteen establishments : —

Average Daily Rates of Wage by Department.

	Print Cloth.	Printers' Sheetings.	Various.	Average.		
Carding —						
Overseers . .	\$3.06	\$3.84	\$2.97	\$3.29 = 12s.	4d.	
Men . . .	1.52	1.67	1.47	1.55	5	9½
Women . . .	0.86	0.88	0.75	0.81	2	2½
Children . . .	0.52	0.50	0.55	0.52	1	11½
Average . .	1.48	1.71	1.43	1.21	4	6½
Spinning —						
Overseers . .	2.94	3.50	2.95	3.07	11	5½
Men . . .	1.67	1.55	1.40	1.51	5	8
Women . . .	0.92	0.88	0.78	0.84	3	1½
Children . . .	0.52	0.48	0.50	0.48	1	9½
Average . .	1.48	1.53	1.41	1.47	5	6

* No distinction as to children.

Average Daily Rates of Wage by Department, — continued.

	Print Cloth.	Printers' Sheetings.	Various.	Average.		
Dressing : —						
Overseers . . .	8.25	8.84	8.05	8.16	11	10½
Men	1.66	1.79	1.51	1.65	6	2½
Women	1.12	0.77	1.00	0.96	8	9½
Children . . .	0.66	0.47	0.54	0.56	2	1½
Average . .	1.67	1.59	1.58	1.58	5	11
Weaving : —						
Overseers . . .	8.18	8.40	8.16	8.28	12	1½
Men	1.68	1.62	1.61	1.62	6	1
Women	1.10	0.97	0.92	1.00	8	9
Children . . .	0.70	0.45	0.55	0.57	2	1½
Average . .	1.64	1.61	1.56	1.60	6	0
General average rate of all departments	1.82	1.61	1.48	1.47	5	6

The rates used in the foregoing Tables are as nearly correct, and the ratios for each class of operatives as nearly complete, as I can at present make them. They belong to an unfinished Paper on the Labor of the United States, as indeed, do many of the rates of wages and earnings quoted in the course of this Report.

The general average rates in these Tables give neither a correct impression of what an operative could expect to earn, nor an accurate idea of the cost of his labor to the manufacturer. As regards the former, it should be observed that, as the operatives receiving the lower rates of wage far outnumber the overseers and others receiving the higher rates of wage, the average rate of pay per operative is, of course, much lower than the general averages of each department, and all the departments obtained in the Tables. Moreover, his annual earnings will depend upon how many days he works, and are not necessarily equal to his daily wage multiplied even by 300 days. As regards the cost of labor, I purpose to refer to it in a subsequent subdivision (*vide* paragraph 156 *et seq.*).

In order to obtain a still more accurate impression of what wages in cotton mills really are, it is desirable to compare the various results already obtained in the different Tables and statements brought forward in the course of the preceding paragraphs.

	Carding.	Spinning.	Dressing.	Wooling.	Average of the four.
Average daily rates:—					
1. Dr. Young's Table, 1869	\$1.25	\$1.48	\$1.54	\$1.70	\$1.48
2. " " " altered for 1872	1.15	1.86	1.46	1.62	1.40
3. The 88 mills, Massachusetts, 1870-71	1.88	1.82	1.70	1.77	1.58
4. The 18 mills, 1872	1.21	1.47	1.58	1.60	1.47
Average of 2, 3, and 4	1.28	1.88	1.58	1.66	1.46
Average of daily earnings:—					
5. Massachusetts, 1871-2	1.12	1.12	1.52	1.61	1.34

ζ. Efficiency of Labor.

Compari-
sons of
labor.

149. The efficiency of the laborer is of more importance to the wealth of a country than his nominal money rate of wage, and is obviously of even more importance in the cost of production of any given manufacture. A comparison of the labor of different countries cannot be fairly made by merely comparing the daily money rates of these countries. As regards the value to the laborer of his wage, the cost of living or the purchasing power of his nominal money wage must be considered. As regards the value to the manufacturer, the ratio of the cost of labor to the actual production within a given time must also be considered. In the well-known instance, many years ago, of cotton-printing in Belgium, the double wage of the English laborer was fully earned by his treble production within a given period, and the cost of production was really cheaper in England than in Belgium in spite of the Belgian competitor receiving only a half of the Englishman's wage per day. In the United States it is usually asserted, and, as regards many industries, apparently with reason, that two Americans will do as much work in a given working day or week as three Englishmen.

Two
Americans
equal three
English-
men.

As the cotton manufacture is one in which the plant has a large share and labor a comparatively small share in the production, it will be better, after indicating the number of hands to machinery in the separate departments, to take the efficiency of labor and of plant, and measure them together by the quantity of production.

Hands tend
more ma-
chinery.

Taking the cotton manufacture through, it can be fairly stated that, in the United States, the hands, as a rule, tend more machinery,

especially looms, than in Europe and, in some cases, than in England. I regret I am unable at present to show this statistically by data collected from a large area. I can only offer indications of the proportion of hands to machinery.

150. In the carding department a mill has, in the preparation section, about three hands to opener, spreader, two lappers; and, in the carding section, one carder per twenty-four to twenty-six cards, self-strippers. Two boys or girls mind the railway and drawing frames for fifty to sixty carding engines. One girl (usually returned as a young person) minds 150 slubber or intermediate spindles, and 304 fine speeder spindles.

Taking both sections, there is about one hand per two to three cards. In a mill of 10,000 mule spindles the distribution would be about as follows:—

CARDING DEPARTMENT.

Hands.	No.	Weekly wage.		Total.		
Overseer	1	\$18.00	\$18.00	£3	7s.	6d.
Assistant	1	12.00	12.00	2	5	0
At the opener	1	4.00	4.00	0	15	0
„ spreader	1	5.00	5.00	0	18	9
At 2 lappers	1	9.00	9.00	1	18	9
52 cards	{ 2	9.00 }	17.00	8	8	9
	{ (men)	8.00 }				
Railway (4 heads)	1	4.50	4.50	0	16	10½
Drawing heads	1	4.00	4.00	0	15	0
150 slubber spindles	1	8.00	8.00	1	10	0
300 intermediate	2	7.50	15.00	2	16	8
1,100 fine speeder	6	7.50	45.00	8	8	9
Also grinder	1	10.50	10.50	1	19	4½
Sweeper	1	4.00	4.00	0	15	0
Helper	1	9.00	9.00	1	18	9
Total	21	—	165.00	30	18	9

In a mill running on coarse goods the card minders are often boys or girls at \$5, or 18s. 9d., a week per twenty to twenty-six cards, self-strippers. This may, however, be bad economy.

The efficiency of the labor in the carding department may seem-Their production. ingly be taken at about 100 lbs. of carded product per hand per day, the superintendence being as one to nine in number.

In this department, with the machinery now in use, a laborer can

produce twice as much as he could have done twenty or thirty years ago.

In spinning-room. 151. In the spinning departments the arrangements vary much. For instance, a mule spinner pieces, and there are only cop boys in the room to assist him. But more usually he has a piecer and back boy. In New England a spinner and boy to two pairs of mules in a 90-foot mill are sometimes to be found. In the Philadelphia district, a spinner with assistance minds 1,500 or 1,440 mule spindles. In Rhode Island, in a fine mill, a mule spinner with back boy minds 1,250 spindles, spinning 28s. and 36s.

There are as many instances of as few as 650 to 700 spindles to a spinner and back boy and piecer. Ring spinning requires about the same attendance per spindle as other throstle spinning. I have heard, however, of a girl (piecer?) attending six and a half sides of ring spinning, say 1,300 spindles. Usually a girl attends to four sides.

Their production. According to the data scattered throughout the records of the Fall River strike, it may be asserted that a spinner, averaging \$2, or 7s. 6d., a day, spins on mules from 170 lbs. to 180 lbs. of yarn (35s.) a day to pay himself, and then \$1½ per week to the back boy. The efficiency of the mule spinner in the United States might seemingly be taken at 150 lbs. per day for himself, and 25 to 30 lbs. for his back boy. But in some cases his efficiency is certainly greater, ranging to 230 and 240 lbs., averaging 30s.

In this department the laborer can produce twice as many lbs. of yarns as twenty to thirty years ago on the same number of spindles.

In dressing-room. 152. In the dressing department the "slasher" is making a great change. It is commonly said that one man with a slasher can dress as many yards in a given time as ten dressers with the usual machines. The efficiency of other operations may be inferred from there being five girls as spoolers and three girls as warper minders in a 10,000 spindle mill. In a large mill with the new warper the proportion would be diminished in number and wage.

In weaving-room. In the weaving department I can give a few more particulars. Here are some of them to show the number of weavers to looms, wherever they tend more than four : —

Hands to looms.	1 girl to 4 jean looms, 100 picks, 17 yards 185 turns.
	1 girl to 4 to 7 print looms, 64 picks, 84 yards.
	1 girl to 4 to 6 print looms, 64 picks, 44 yards 180 turns.
	1 girl to 6 to 8 print looms, 64 picks, 35 yards 140 turns.

- 1 woman to 7 to 8 print looms, No. 82, 64 picks, 40 yards 156 turns.
 1 woman and child of 12 years to 10 print looms, No. 82, 64 picks, 40 yards 156 turns.
 1 girl to 4 gingham looms, 140 turns.
 1 girl to 8 to 5 sheeting looms (in Ohio).

The work which is required of an eight-loom weaver of print cloth appears to be 40 cuts a week, which are equal to from \$10 to \$11, or 17s. 6d. to 2l. 0s. 3d., in wage. If he do not work up to this, he may not be "wanted." The gingham loom weaver seems to be expected to produce 20 cuts a week. These quantities might, therefore, be taken as indicating the standard of efficiency of the weaver in the United States.

A girl weaver can now produce twice the quantity of cloth she could have produced twenty to thirty years ago.

153. If it be assumed that the nearly complete returns from eight large establishments in Massachusetts, as quoted in paragraphs 130 to 141, are substantially correct as to number of hands employed, then the following proportions of hands in each department can be deduced from them:—

	Number of hands.	Per 1,000 spindles.
Carding and blowing rooms	881	2.4
Spinning ditto	1,090	3.0
Dressing ditto	642	1.8
Weaving ditto	2,140	6.0
Cloth ditto	157	0.45
Repair shop, &c.	848	1.00
Total	—	14.65

Or say fourteen and a half hands per 1,000 spindles. In a fine mill in New England it is about twelve and a half hands per 1,000 spindles.

From the Lowell, Lawrence, and other local statistics the following proportions of all hands per 1,000 spindles can be deduced:—

Proportion
of hands at
Lowell and
other
places.

Mills.	Nature of products.	Number of hands.	Number of spindles.	Hands per 1,000 spindles.
1	Print cloth	170	11,000	15
2	Ditto	180	10,000	18
3	Ditto	1,900	105,500	17
4	Ditto	188	8,850	15
5	Print cloth and sheeting	270	16,500	16
6	Ditto ditto	816	52,000	16
7	Ditto ditto	1,600	100,000	16
8	Ditto ditto, No. 30 to 40	1,500	92,000	16
9	Fine shirtings, &c.	1,600	80,000	20
10	Sheetings, &c., No. 14	520	27,100	19
11	Ditto, No. 10 to 37	1,170	77,000	15
12	Ditto	250	17,000	15
13	Ditto	360	20,000	18
14	Jeans, sheetings, print cloth, &c.	1,200	71,000	17
15	Sheeting, &c., print cloth, hosiery	1,630	75,400	21
16	Ditto ditto, ticks, stripes, &c.	1,100	51,250	21
17	Shirtings, corset jeans, gingham, dress goods	875	88,800	23
18	Ginghams	354	10,000(?)	35
19	Denims, stripes, ticks, &c.	870	26,000	18
20	Sheetings, ticks, &c.	233	10,000	23
21	Flannels, quilts, and sheetings	1,000	51,600	19

It should be recollected that in these proportions of hands is often included the number of hands in an extensive repair shop, which in many instances might be called a machine shop.

Efficiency
of labor
and plant.

154. The next point is to indicate the production from a given plant within a given period by a given number of hands; and this is perhaps the most difficult point on which to find information. The local statistics of Lowell and Lawrence show the following data as bearing upon this point: —

Mill.	Hands.	Spindles.	Looms.	Yards per week.	Kinds of Product.
1	520	27,068	764	160,000	Sheeting, drills, &c., No. 14.
2	1,170	77,002	2,091	420,000	Ditto ditto, No. 10 to 37.
3	1,500	92,060	2,000	380,000	Sheeting and printers, No. 30 to 40.
4	1,200	71,000	1,724	380,000	Jeans, flannels, sheetings, &c.
*5	1,075	51,268	1,322	225,000	Flannels, ticks, stripes, &c.
6	1,950	105,568	2,533	490,000	Sheetings, &c., No. 5 to 53.
†7	875	33,280	750	125,000	Print cloth, No. 30 to 37.
8 {	3,000	105,888	8,671	700,000	Ginghams, trouserings, &c.
(worsted)	23,884				Cotton and wool dress. Goods and prints.

* $\frac{1}{2}$ of weight of production is wool worked up in the mill.

† In this mill there is some labor for dyeing, which I cannot separate.

From these data it can be inferred that in round numbers the production per hand per week is —

	Yards.
1. Of sheetings, &c., No. 14	800
2. Of ditto, No. 10 to 37	850
3. Of sheeting and printers, No. 30 to 40	250
4. Of various	810
5. Of ditto, No. 5 to 53	210
6. Of printers, No. 30 to 37	250
7. Of various	140
8. Of cotton and wool dress goods	285

Likewise it may be inferred that the production per loom per day of eleven hours and per hour is : —

Production
per loom
and hour.

	Hands.	Per day.	Per hour.
	No.	Yards.	Yards.
1. Of sheetings, &c., No. 14	0.68	85	8.2
2. Of ditto, Nos. 10 to 37	0.66	85	8.2
3. Of sheeting and printers, Nos. 30 to 40	0.75	82	8.0
4. Of various	0.69	87	8.4
5. Of ditto, Nos. 5 to 53	0.80	28½	2.6
6. Of printers, Nos. 30 to 37	0.74	82	8.0
7. Of various	1.17	27½	2.5
8. Of cotton and wool dress goods	0.82	82	8.0

The two print cloth mills (Nos. 3 and 6) agree as to production and number of hands required. The cotton and worsted mill (No. 8) has the same production, but, owing to the working of the wool, requires 10 per cent more hands. The two sheeting mills (Nos. 1 and 2) agree as to production, but the fine mills seem to require fewer hands. These statistics show, however, a rather low average rate of speed for the looms in print cloth mills.

A print mill of over 82,000 spindles produced at ten hours a day 3,223 yards per loom per hour, and at eleven hours a day from 3,235 yards to 3,375 yards, or an average of 3,303 yards per hour. Another print mill of over 10,000 spindles produced, running ten hours a day, 3,664 yards per loom per hour, and running eleven hours a day, 3,712 yards per hour.

A gingham mill of 26,000 spindles produced an average of the Gingham, whole year, all terms of the comparison excepting the running time remaining the same, as follows : —

	Yards per loom per hour.
In 1860 —	
Running full time 11 hours	2.84
In 1862 —	
Running half time 5½ "	2.80
In 1863 —	
Running three-quarter time 8½ "	2.29
In 1868 —	
Running full time 11 "	2.45

In the same mill a weaver produced as follows:—

	Cuts in 11 hours.
In 1862 —	
Half time 5½ hours	2,727
In 1863 —	
Three-quarter time 8½ "	2,708
In 1868 —	
Full time 11 "	3,063

Print
cloths.

A print cloth mill of about 3,700 spindles produced, all other things being equal, —

In 1867 —	
Running 10 hours . . . 3,861 pieces a week, or 2,895½ yards per hour.	
In 1869 —	
Running 11 hours . . . 4,850 " " " 2,966 " "	
In 1870 —	
Running 11 hours . . . 4,856 " " " 2,970 " "	

Another print cloth mill of nearly 4,500 spindles produced, —

In 1867 —	
Running 10 hours . . . 36,210 yards a day, or 3,621 yards per hour.	
In 1869 —	
Running 11 hours . . . 39,984 " " " 3,635 " "	

Another print mill of nearly two hundred hands produced in 1870—71 about 2,500 pieces a week, or 12½ pieces of 45 yards per hand, or 8½ yards per hand. Another print mill in five weeks with 535 hands, running ten hours a day, produced 1,125,000 yards, at a cost of 20,294 dollars in wages; and with 486 hands, running eleven hours, 1,495,357 yards at a cost of 21,442 dollars in wages; in the latter case at reduced rates of wage and increased rate of speed of machinery. These data show 7 yards and 9.3 yards per hour per

hand respectively. These results differ considerably from the results deduced from the Lowell and Lawrence published statistics.

A coarse sheeting mill of 22,000 spindles produced 9,000 lbs., or Sheetings. 30,000 yards daily, of heavy drills, sheetings, and shirtings. A fine sheeting mill of 30,000 spindles produces 1,600 lbs., or 15,000 yards, of fine sheeting, shirting, and lawns of the finest yarns in the United States.

I think it may be inferred with approximate accuracy from these data that the actual production averages in print mills $3\frac{1}{2}$ yards, in sheeting mills $3\frac{1}{2}$ yards, and in gingham mills $2\frac{3}{4}$ yards per loom per hour, but in print mills may range to as many as 5 yards per loom per hour. Likewise it may be inferred, with similar approach to truth, that the efficiency of labor and plant may be measured by an actual average production in print and sheeting mills of five yards, and in gingham mills of $2\frac{1}{2}$ yards per hand per hour. Hence, taking the average daily rate of wage at $1\frac{1}{2}$ dollars, it may be that the efficiency of the labor and plant is in white work five yards per hour, at a wage cost of $11\frac{1}{2}$ cents, or nearly $5\frac{1}{2}d.$, and in coarse colored work $2\frac{1}{2}$ yards, at a similar wage cost. Average efficiency.

In a thread-mill of 30,000 spindles the production of 436 persons, working 11 hours a day for 26 weeks, was 375,340 dozen spools of cotton thread. The production of 356 persons, working $8\frac{1}{2}$ hours a day for five weeks, was 52,700 dozen spools. The former shows 6.11 spools and the latter 7.18 spools per hand per hour. Efficiency in thread-mill.

155. In hosiery 105 hands appear to be able to make 120,000 dozen of women's hose. In Lowell a mill of 10,400 spindles produces 700 dozen of hose in general in a day. In hosiery.

In printing, according to the Lawrence Local Statistics, 1,000 hands in printing. print and dye per week 953,687 yards of calicoes and cotton and worsted dress goods, at a cost in wages of \$8,100.

In Ohio 225 looms, averaging 100 turns, making sheetings Nos. 14, 44, and 48, produced 18,650 yards, at a cost of about \$1,100 in wage. In Ohio.

In Georgia 507 hands, costing \$87,547, produced in six months, 1867-68, 3,888,300 yards, the 505 looms averaging $49\frac{1}{2}$ yards daily per loom. In Georgia.

As regards the general efficiency of a cotton mill in the United States, it may be mentioned that in a spinning and weaving mill of 60,000 spindles, running in finer numbers averaging No. 50, the produce per month of the first two months after starting was 91 per cent of the possible product, In general.

According
to census.

Lastly, the result deduced from the Census Statistics in Table (H) of subdivision *a* of this part of the Report may be referred to as tending to confirm the results obtained in the preceding paragraphs as to the efficiency of labor and plant. That column shows about eleven men to every 100 lbs. of product. The results in the preceding paragraphs, stated in the same terms, show about ten men to every 100 lbs. of product.

η. Cost of Labor.

Rise in
labor.

156. The rise in the price of labor may be gathered from the two following illustrations. The labor in a yard of calico, running 7 to the lb., 64 × 64, and Nos. 28 and 40, was in 1860 $1\frac{1}{10}$ cents, and in 1872 $1\frac{1}{10}$ cents. Goods which cost per yard $1\frac{3}{10}$ cents in 1840, $1\frac{5}{10}$ cents in 1850, $1\frac{7}{10}$ cents in 1860, and 2 cents in 1870, still cost 2 cents per yard in 1873, including all labor from the first outlay on cotton by opening the bales, to the packing and invoicing of the cloth. It has also been stated that the kind of work costing in daily wage \$1.12, or 4s. 2½d., in 1860, now costs \$1.35, or 5s. 0¾d. The following highest and lowest wages in 1861 and 1872 will also illustrate the rise in labor: —

	Day wages, 1861.		Day wages, 1872.	
	Highest.	Lowest.	Highest	Lowest.
Mule spinners	\$1.88	\$1.17	\$2.00	\$1.35
Dresser minder	1.25		2.00	
Carder (8d hand)	1.00	0.75	1.25	0.90

The present price of labor can be gathered from the facts and estimates already recorded in this Report. From these also the cost of labor to the manufacturer can be ascertained with approximate accuracy.

Cost of
labor per
hand in 8
mills.

If it be assumed that the nearly complete returns from eight large establishments, probably representing 350,000 spindles, in Massachusetts, as quoted in paragraphs 130 to 141, are substantially correct as to the number of hands employed in each department and as to the actual earnings of each class of hand, and if it be further assumed that the actual rates of pay per day deduced from these actual earnings represent very nearly the actual cost of each class of hand per working day of eleven hours to the manufacturer, the following table, which I have calculated, will represent with some approach to truth the average actual cost of labor per day for eleven hours in a cotton mill: —

By classes.

Table showing Cost of Labor per Hand.

	No. of hands.	Wage per day.		Total cost of labor.	
1. Carding and blowing rooms :—					
Supervision	58	\$1.97	7s. 4½d.		
Preparation	487	1.02	8 10		
Carding	282	1.20	4 6		
Other labor	54	0.72	2 8½		
Proportionate average .	881	1.16	4 4½	\$1.16	4s. 4½d.
2. Spinning room :—					
Supervision	69	2.07	7 9		
Spinning	921	0.84	8 1½		
Other labor	100	0.70	2 7½		
Proportionate average .	1,090	0.90	8 4½	0.90	8 4½
8. Dressing room :—					
Supervision	48	2.08	7 7½		
All other labor	599	1.10	4 1½		
Proportionate average .	642	1.16	4 4½	1.16	4 4½
4. Weaving room :—					
Supervision	92	2.04	7 7½		
Weavers	1,721	1.87½	5 1½		
Other labor	185	1.09	8 1		
Proportionate average .	1,948	1.88	5 2	1.88	5 2
5. Cloth room :—					
Supervision	12	2.27½	8 6½		
All other labor	145	1.02	8 10		
Proportionate average .	157	1.12	4 2½	1.12	4 2½
6. Repair shop, &c. :—					
Supervision	6	8.75	14 0½		
All other labor	170	2.72	10 2½		
Proportionate average .	176	2.75	10 8½	2.75	10 8½
7. Engine room :—					
Engineers	8	2.21	8 3½		
Firemen	11	1.81	6 9½		
Proportionate average .	14	1.97	7 4½	1.97	7 4½
8. Watchmen	47	1.57	5 10½	1.57	5 10½
9. Other labor :—					
Supervision	7	2.28½	8 4½		
Laborers	108	1.75	6 6½		
Proportionate average .	110	1.78	6 8	1.78	6 8
Proportionate average of 6, 7, 8, and 9	. .	. .	. .	2.22	8 4

Total cost
by depart-
ment.

If, moreover, the returns from which the foregoing table is calculated be assumed to give a substantially correct statement of the distribution of the labor of a mill into the several departments, the following table on a basis of 100 hands can be computed:—

	No. of hands.	Cost per day per hand.	Total cost per day.
Carding and blowing rooms	16.25	\$1.16	\$18.85
Spinning rooms	21.45	0.90	18.90
Dressing rooms	12.55	1.16	14.63
Weaving rooms	39.85	1.38	54.00
Cloth rooms	8.10	1.12	8.47
All other labor	6.80	2.22	15.10
	100.00		\$124.95

This shows that the average total cost of labor in a cotton mill is \$1.25, or 4s. 8½d., per hand per day of eleven hours. But it should be borne in mind that, although this average is probably very near to the actual cost of labor, it is only an estimate, of no greater value than that of the data on which it is based. In a mill in 1872, however, the actual proportionate average pay per hand per day of eleven hours was \$1.26, inclusive of labor for dyeing. Hence \$1.25 may be assumed to be correct.*

Percent-
age in each
depart-
ment.

If the foregoing cost of labor be represented in parts of 100, the proportions would stand thus:—

Carding and blowing room	\$15.08
Spinning room	15.12
Dressing room	11.72
Weaving room	43.20
Cloth room	2.79
Other labor	12.09
Total	\$100.00

If these proportions be stated for the three chief divisions of a cotton mill without the decimal fractions, they would be, —

Carding and spinning	30
Dressing and weaving	35
All other labor	15
Total	80

* November 12.—Owing to the recent decline in wages, this estimate may be reduced by 10 to 20 per cent, and an estimate of \$1.10 be assumed for a few years. — J. P. H.G.

If it were assumed that the production were at the average rate of ^{Cost of} 1 lb. per hand per hour, then 11 cents 4 mills, or a fraction over 5d., ^{labor per lb.} would represent the cost of labor per lb. But taking into consideration the capacity, as it is here called, of the plant, and also the efficiency of the laborer as hereinbefore indicated, the following estimated statement of the average cost of labor may be computed : —

Cost of Labor.

	Per hand per hour.	Per lb. of product.		Per cent.
	c. m.	c. m.	d.	
Carding	10 5½	1 8½	0.608	18.5
Spinning	8 2	1 2½	0.568	12.5
Dressing	10 5½	1 1½	0.517	11.5
Weaving	12 5½	4 2½	1.912	42.5
Other labor	17 0	2 0	0.9	20.0
Total	—	10 0	4.5	100.0

157. The average product per spindle in print cloth mills seems, ^{Product per} according to the published statistics hereinbefore quoted, to be $\frac{1}{4}$ lb. a ^{spindle.} week (*vide* also paragraphs in division 1, subdivision d, 15; and division 2, subdivision l, 188). Similarly the average product per spindle in sheeting mills seems to be from $1\frac{1}{4}$ to 2 lbs. per week. Considering that the bulk of the cotton manufacture of the United States is in print cloth and sheetings and similar fabrics, the average production per spindle of the aggregate manufacture may perhaps be fairly taken at $1\frac{1}{4}$ lbs. per spindle per week. The Census Statistics show, it is true, only a little over $\frac{1}{3}$ of a lb. per spindle per week for Massachusetts; but in them the averages are lessened by the influence of returns from mills not running full time throughout the year, and by a comparatively large proportion of fine goods.

In the Lowell Local Statistics the medium produce of a spindle is stated at $1\frac{1}{4}$ yards per day. This seems to include both cotton and woollen work. But taking it, after some allowance for the wool, for cotton alone, and taking the average produce of power-loom cloth at 4 yards per lb., it does not differ materially from the above average of $1\frac{1}{4}$ lbs. per spindle per week.

158. Taking, then, this average of $1\frac{1}{4}$ lbs. per spindle, and taking ^{Cost of} the hands per 1,000 spindles at an average of $15\frac{1}{2}$ (*vide* paragraph ^{labor in} white work.

153), the following statement would represent the total cost of labor, and might represent distribution thereof:—

	c.	m.	d.
Carding	1	2.2, or 0.55	
Spinning	1	2.8	0.5535
Dressing	1	0.8	0.4685
Weaving	8	8.2	1.8
Other labor	1	8.0	0.81
Total	9	1.0	4.177

In printers. In print cloth mills, with $\frac{3}{4}$ lb. of product per spindle per week and all other factors unchanged, the following statement would represent the total cost of labor, and might represent the distribution thereof:—

	c.	m.	d.
Carding	2	0.5, or 0.9225	
Spinning	1	9.0	0.855
Dressing	1	7.5	0.7875
Weaving	6	4.5	2.9025
Other labor	8	0.5	1.8725
Total	15	2.0	6.84

In sheet-
ings.

In sheeting mills, with $1\frac{1}{2}$ lbs. of product per spindle per week and all other factors the same, the following statement would represent the total cost of labor, and might represent the distribution thereof:—

	c.	m.	d.
Carding	1	0	0.45
Spinning	0	9 $\frac{1}{2}$	0.488
Dressing	0	7 $\frac{1}{2}$	0.348
Weaving	8	2 $\frac{1}{2}$	1.4625
Other labor	1	6 $\frac{1}{2}$	0.72
	7	6	3.4185

In sheeting mills, with 2 lbs. of product per spindle per week, and 18 hands per 1,000 spindles, all other factors remaining the same, the following statement would represent the total cost of labor, and might represent the distribution thereof:—

	e. m.	d.
Carding	0 9½	0.4275
Spinning	0 8½	0.394
Dressing	0 8	0.36
Weaving	2 9½	1.838
Other labor	1 4	8.468
	7 0	2.9875

If there were 20 hands per 1,000 spindles in such a mill as the foregoing, the cost of labor would be 7 cents 6 mills, and distributed as in the preceding statement.

The range would thus seem to be from 7 to 15 cents, or from 3d. to 6½d., per lb. of product; and, this being assumed to be approximately correct, the average of 10 cents, or 4½d., per lb. does not seem unfair.

As regards the distribution of the cost of labor, it is to be observed that the proportion of cost of labor in each department would vary somewhat from the percentages of the 10-cent estimate, according to the labor required by the nature of the fabric. In regard to print cloth, it is possible, with the data collected in this Report, to compute the following estimate of cost of labor:—

From other
data cost in
printers.

*Cost of Labor per lb. of Print Cloth. Seven Yards to the lb. 64 × 64.
No. 28 × 40.*

	e. m.	d.	e. m.	d.	m.	d.
Preparation, carding, and supervision . . .	—	—	—	—	1 6½	0.748
Spinning	—	—	1 4	0.468	—	—
Supervision	—	—	0 1½	0.068	1 5½	0.72
Spooling	0 9	0.405	—	—	—	—
Warping	0 8	0.185	—	—	—	—
Drawing-in	0 2½	0.112	—	—	—	—
Dressing	0 7	0.315	—	—	—	—
Other labor	0 1	0.045	—	—	—	—
Supervision	—	—	2 2½	1.012	—	—
	—	—	0 2½	0.102	2 4½	1.114
Weaving	—	—	4 5	2.025	—	—
Other labor	—	—	0 2	0.090	—	—
Supervision	—	—	0 2½	0.102	—	—
All other labor and supervision	—	—	—	—	4 9½	2.217
	—	—	—	—	8 0	1.85
Total	—	—	—	—	18 6	6.144

The cost of carding and preparation is calculated from the carding department of a fine mill in paragraph 150. The cost of spinning is the piece price for mule spinning. The cost of preparation for weaving, and the cost of weaving, are calculated from the piece prices. The cost of all other labor is an estimate. The supervision is computed from the data in preceding paragraphs. In the distribution of the cost of labor, the material variations from the previous calculation of the labor cost of print cloth are a lesser cost for weaving, and a higher cost for the preparation in the dressing-room, after allowing one-eighth for the difference in total cost.

Confirma-
tory state-
ments.

As confirmatory of this computation of the cost of labor in print cloths, the calico mentioned in paragraph 156, and costing $1\frac{2}{10}$ cents per yard, or $13\frac{2}{10}$ cents per lb., in labor, may be quoted. This differs by $\frac{2}{10}$ cents only from the above computation. Moreover, it is commonly supposed throughout New England that the labor cost of print cloth is 2 cents per yard. This, at 7 yards to the lb., gives 14 cents, or a small fraction over $6\frac{1}{2}d.$ ($6.3d.$), per lb.

In sheet-
ings.

160. In a similar manner the following statement respecting the labor in fine sheetings can be computed : —

*Cost of Labor per lb. of Sheetting. Three Yards to the lb. 100×100 .
Nos. 28 and 36.*

	e. m.	d.
Carding and supervision	1 8	0.585
Spinning „ „	1 2	0.54
Dressing „ „	1 $8\frac{1}{2}$	0.607
Weaving „ „	8 $1\frac{1}{2}$	1.42
All other labor	2 0	0.90
	9 0	4.052

Confirma-
tory state-
ments.

In the course of a discussion on the wool tariff it was incidentally stated by a large fine wool manufacturer, as a well-known fact, that cotton goods selling at fourteen cents a yard cost $2\frac{1}{2}$ cents per yard in labor. The goods to which he referred were probably 36-inch sheeting, 3 to $3\frac{1}{2}$ yards per lb. If so, the cost per lb. would be $7\frac{1}{2}$ to $8\frac{1}{2}$ cents, or from $3\frac{1}{10}d.$ to nearly $4d.$ Moreover, it has also been stated that a 36-inch sheeting, 60×64 , $3\frac{1}{2}$ yards to the lb., costs in labor about 9 cents, or $4\frac{1}{10}d.$ These statements tend to confirm the foregoing computation of the cost of labor per lb. of sheeting.

161. Similar computations, based upon other data in preceding paragraphs as to rates of wage, might be made, as indicative of the same actual labor cost. But I think it is unnecessary to produce further testimony, excepting one or two general statements which may tend to confirm in general the cost of labor which has been recorded. Mr. Commissioner Wells, in 1869-70, estimated, in his well-known report, the labor in the cotton manufacture at about 12 cents per lb. But 12 cents in 1869 would now be about 10 cents, after due allowance for reduction of wages and the altered relation of currency to gold. It is not unusual, I am informed, to take $\frac{2}{10}$ of a cent per hank, as representing the pay-roll for spinning and weaving 64s. If this test be applied, in the way in which I presume it should be applied, to the computation of the cost of labor in print cloth in paragraph 159, it will give 10 cents 4 mills for the cost of spinning and weaving, inclusive of the necessary preparation in both cases. If the 3 cents for "all other labor" be added, the total will be 13 cents 4 mills, or within 2 mills of that computation. Statements in general.

162. In conclusion, the results which have been deduced as to the cost of labor may be thus summed up: * — Summary of cost of labor.

(1) The proportionate average cost of labor per hand per day of eleven hours is $1\frac{1}{4}$ dollars, or 4s. $8\frac{1}{4}d.$

(2) The standard of the average total cost of labor in the cotton manufacture in the aggregate may be taken at 10 cents, or $4\frac{1}{2}d.$, per lb. of product.

(3) The average cost of labor in fine print cloth is from 13 to 14 cents, or about $6\frac{1}{4}d.$, per lb. of product.

(4) The average cost of labor in sheetings is from 8 to 9 cents, or about $3\frac{3}{4}d.$, per lb. of product; fine standard sheeting being a small fraction over $4d.$ per lb.

In the West these rates per lb. would range rather higher. But in West. coarse sheetings, 280 yards to the lb., do not seem to cost more than 8 cents, or $3\frac{1}{2}d.$, for labor per lb. of product in Ohio. In the Philadelphia district they might range a fraction lower. In the South they would be rather lower. In Philadelphia. In South. According to the statistics of a 4,000 spindle mill, ring spinning, the cost of all labor (including packing) per lb. of product for spinning yarn No. 20 was about $3\frac{1}{2}$ cents, or about $1\frac{3}{4}d.$ If the weaving be assumed to cost about 10 per cent more than the spinning, then the total cost of labor for cloth, coarse sheetings,

* November 12. — At the present date fully 15 per cent should be deducted, and for a few years probably 10 per cent. — J. P. H.G.

would be nearly 7 cents, or $8\frac{1}{10}d.$, per lb. In a larger mill the cost should be less. In another mill, of 505 looms, the cost of all labor was only about 6 cents, or nearly $2\frac{3}{4}d.$, per lb. of product of heavy sheetings.

It will be remembered that the Census Statistics were shown (paragraphs 38 to 46) to indicate similar results, the variation being greatest in sheetings.

Compared
with
census.

Cost of Labor as indicated.

	By census.	By preceding computations.
	<i>d.</i>	<i>d.</i>
In the aggregate	5.2	4.5
In print cloth	5.4	6.25
In standard sheeting	4.8	3.8 to 4.0
In standard sheeting in South	3.0	3.0

Cost of
labor in
printing.

163. In printing, the labor cost, as shown by the returns of the Pacific Mills, Lawrence, is nearly 9 mills, or $\frac{4}{10}d.$, per yard for printing and dyeing calico and delaines and other mixed goods.

The cost of labor, in bleaching, dyeing, and printing, and in hosiery, thread, and narrow fabric mills, would bear, with little variation, about the same proportion to the cost of labor in print cloth and sheetings as they do in England. In some cases it could be computed from the data grouped under the respective headings in this report. (*Vide* also the deductions from the census returns in paragraphs 65 and 68.)

(*To be continued.*)

Industrial Miscellany.

A FREE TRADE WEDGE.

THE policy of the Association of Wool Manufacturers in relation to the proposed Reciprocity Treaty has what all must regard as its most authoritative approval, in the views expressed by its first President, Mr. Bigelow. This gentleman, writing us from Europe, where he has been sojourning for the last year, presents in a letter not intended for publication, the most important point in the question so succinctly

and clearly that we cannot withhold his opinions from his friends. He says, —

“ A Reciprocity Treaty with Canada is a subject which has heretofore engaged the attention of our Association. The grounds on which we favored the repeal of the old treaty may justly be urged in opposition to the ratification of the new one.”

“ The proposed treaty, so far as the mother country is concerned, may be regarded as a *free trade wedge*. The enclosed article on the subject, cut from the London ‘Daily News,’ of this date (Aug. 22), supports this view. Our countrymen are not generally aware of the insidious means employed by England to impose her free trade views upon other nations. Efforts on her part to negotiate commercial treaties, though in many instances they have failed of success, are a part of these means. Mr. Gladstone has frankly confessed this in a report which I printed in my work on the tariff. This is a view of the subject which our people ought to more thoroughly understand.”

These are the views of the most practical of all American political economists, whose great work on the tariff is the most impregnable of all the defences of our protective system. They are entitled to more weight, because they are conceived in the calmness of a sojourn in a foreign land, and without any influence from public opinion here.

The article from the “News,” prompted by the intelligence of the resolutions against the Reciprocity Treaty adopted by the Republican Convention of Pennsylvania, is too long to be copied. It evidently was written to affect public opinion in this country, and is conceived in that spirit of maternal solicitude for the manufacturing interests of the United States, and without regard to British interests, which characterizes English teachings.

The ulterior object of the treaty is frankly admitted by the “Morning News.” Referring to the resolutions at Philadelphia, which condemned the treaty as an attempt “to establish free trade,” it says, “These shrewd Pennsylvanians did not make a bad guess.” After appealing to the Western farmers to “secure the advantages to trade and navigation which are contemplated by this treaty,” — ignoring, of course, the uncertainty of a dependence on a foreign market, and the loss of a home market contemplated in the free trade policy, — the article concludes with this disinterested declaration : —

“The United States have more to gain than Canada by the renewal of the Reciprocity Treaty; and the offers of the Dominion Government are so large and liberal that it would be neither becoming nor prudent for it to press them upon indifferent or reluctant negotiators. In due time the peo-

ple of the United States are sure to find out by what course their interests may be served."

Mr. Bigelow quotes in his book the letter of Mr. Gladstone, to show that the free trade propagandism of England is but one of the persistent "efforts of England to extend her manufactures."

It would seem that Mr. Gladstone, wiser than his successors in the British Ministry, who would out-Herod Herod, had already discovered that his efforts to engraft a British policy upon other nations had been pushed too far. Still his letter is a conclusive statement of the primary object of modern British diplomacy, and of the ruling motive in the abandonment of the old restrictive system.

Mr. Gladstone says:—

"Between 1841 and 1845 I held office in the Board of Trade; and this was the period during which England was most actively engaged in the endeavor to negotiate, with the principal states of the civilized world, treaties for the reciprocal reduction of duties upon imports. *The task was plied on our side with sufficient zeal; but in every case we failed. I am sorry to add my opinion that we did more than fail.* The whole operation seemed to place us in a false position. Its tendency was to lead countries to regard with jealousy and suspicion, as boons to foreigners, alterations in their laws, which, though doubtless of advantage to foreigners, would have been of far greater advantage to their own inhabitants.

"England, finding that she could make no progress in this direction, took her own course; struck rapid and decisive blows at the system of protection; and reduced, as far as the exigencies of the public service would permit, the very high duties, which in many cases she maintained simply for the purpose of revenue, upon articles that had no domestic produce to compete with. While our reasoning had done nothing, or less than nothing, our example effected something at least, if less than we could have desired: and commercial freedom has made some progress in other countries since the year 1846; whereas shortly before that time, even while we were relaxing our tariff, it had actually lost ground.

"When we endeavored to make treaties, we were constantly obstructed by the idea, prevailing abroad, that the reduction of tariffs would redound to our advantage only, and would be detrimental to other countries. Politicians and speculators continued to propagate this idea. It was certainly shaken when the world saw us *expose our own protected interests to competition, without making a condition of corresponding relaxation elsewhere*; but I am fearful lest it should again make head, if we too actively employ political influence in urging the adoption of measures for the relaxation of foreign tariffs.

"There is one domestic feature which I wish it were in our power effectually to exhibit to the governments and inhabitants of foreign countries.

They know by statistics, which are open to the world, the *immense extension which our commerce has attained under and by virtue of freedom of trade*, and the great advancement that has happily been achieved in the condition of the people: but they do not know what it has cost us to achieve this beneficial, nay, blessed change; what time; what struggles; what interruptions to the general work of legislation; what animosities and divisions among the great classes which make up the nation; what shocks to our established modes of conducting the government of the country; what fears and risks, at some periods, of public convulsion. These were the fine and penalty we paid for long adherence to folly. We paid this fine and penalty upon returning to the path of wisdom, which we then, too late, wished that we had never left. It is not easy to calculate its amount; but if it could be exactly reckoned, and fully exposed to the eyes of other nations, our *juniors in trade*, it might supply them with a timely warning against imitating our former errors, and with the best encouragement to the adoption (before they themselves become entangled in the creation of artificial interests) of our recent and better example."

We may profitably pause for a moment to read Mr. Bigelow's exposure of the fallacy of Mr. Gladstone's statement that the "immense extension which British commerce attained" was "under and by virtue of free trade."

"The vast extension of British commerce, in consequence of free trade, and the great liberality of England in exposing to universal competition her own protected interests, without insisting on corresponding relaxation elsewhere, are positions assumed by Mr. Gladstone, and maintained by hundreds of English orators and writers, with the utmost confidence, and with a self-complacency which is amusing. Official facts and numerical comparisons already presented in this work show how little foundation there is for these assumptions. They show that there were other and adequate causes for the expansion of English trade, — causes of general operation, and leading to similar results in countries where protection still reigned. They prove that England, in removing the duties from manufactured goods, made no sacrifice, as those duties had ceased to be protective, and yielded almost nothing to revenue; that abolition of imposts on the raw material was another and a most effective form of protection granted to the manufacturing classes; while the repeal of the corn-laws — the only protected interest of any magnitude that was affected by the free trade reform — was virtually another boon to the same classes, though conferred under a pressure which left the little over-peopled island no alternative. England, having arrived at a condition which enables her to manufacture more abundantly and cheaply than anybody else, and thus to undersell her rivals at their own homes, — a fact acknowledged and proclaimed by her greatest statesmen, — was, in truth, perfectly protected under those great laws of trade which comprehend and override all statutory enactments. We have demonstrated that the changes

which she made in her tariff, so far as they were of any importance, were changes demanded by the peculiar circumstances of her own case. To hold up this example of England as a model for other nations seems to us simply absurd. This is what she has done and is doing. She even wonders at the obtuseness, while she kindly pities the obstinacy, of her commercial 'juniors,' who cannot or will not understand that when she advises them to adopt free trade, she is moved mainly by a regard for their welfare. Strange, indeed, that they prefer to look at their own interests with the optics which nature gave them, rather than through spectacles which England is so anxious to put on their noses ! ”

It has always been a favorite method of England to aggrandize her interests by treaties with foreign nations. History furnishes three signal instances, among others, of the disastrous consequences to outside nations from entanglement in the web of British diplomacy. The old story, “ ‘ Walk into my parlor,’ says the spider to the fly,” is constantly repeated in British diplomacy, in spite of the warnings of history.

One would suppose that the famous or rather infamous Methuen Treaty would be a perpetual warning against British wiles. At the close of the seventeenth century, Portugal, by interdicting the entry of foreign fabrics, had succeeded in supplying her own population and her great colony, Brazil, with manufactures of her own production, especially woollen goods. In 1703, England, having in view the interests of her woollen manufacturers, made the Treaty of Methuen, — a veritable *reciprocity* treaty, — by which, in consideration of certain favors to Portuguese wines, she secured the free admission to Portugal of British woollen goods. This treaty proved a mortal blow to Portugal. Her manufacturing industry entirely disappeared. While all Europe progresses, Portugal, in her depressed industry, stands as a “ sort of disgraceful wonder in the middle of the nineteenth century.” Such is the heritage which British “ reciprocity ” bequeaths to confiding nations.

In 1786 a treaty was concluded between France and England, which admitted into the latter country French productions of luxury and taste in exchange for an analogous concession for the admission to France of English goods of apparently small price, but which, suiting all classes, are the essential basis of the industry of a people. This treaty is declared by French historians to be “ the most fatal blow that the textile manufacturers of France had ever received.” Before the lapse of the second year from the conclusion of the treaty, France was so flooded by English importations of cloth that she

ceased to even attempt to supply her own consumption. France speedily abrogated this disastrous treaty, and was recovering her manufactures when the Revolution completely prostrated all her industry.

The Anglo-American Treaty of 1818 is a signal instance of our own folly in conceding commercial privileges by treaties with England. The northern fisheries were won from France by the heroism of the farmers and fishermen of New England at Louisburgh; and yet by that treaty we tamely relinquished our unquestionable rights of fishing on the shores and within the headlands of British North American waters. It was this foolish concession which enabled England to impose upon us the old Reciprocity Treaty. It was this which enables her to hold over us a claim for untold sums provided by the Treaty of Washington, the relinquishment of which claim is to be the price paid for the proposed Reciprocity Treaty.

The vast scale upon which organization is conducted in England to influence the tariff policy of other nations does not receive sufficient attention here. The Cobden Club, with its sixty American *honorary* members, is one illustration. We have before us the reports of the Associated Chambers of Commerce of England. There are some forty of these organizations; and their reports show conclusively that their main object is to affect the tariff policy of other nations. One of their chairmen says, "The great work of the chambers of commerce is to sow seed;" and then he refers to the modification in the tariffs of Belgium and Italy, and to the exertions of the "chambers" which rendered the French Treaty possible, as fruits of the seed they had sown. Mr. Mallet, the representative of the government "Board of Trade," distinctly declares the motive of the Anglo-French Treaty, as he "was firmly convinced that breaking down the French tariff would be taking the first step towards breaking down the whole of the protective tariffs of Europe." The reports are full of the efforts to undermine the tariffs of the obstinate nations, Russia and Austria. The official reports declare that the "completion of efforts for greater freedom of trade with Russia, Austria, and the United States are questions of the utmost importance, and are among those on which combined action among the chambers of commerce is especially desirable." The reports doubt if "the time may yet be ripe for action" with the United States, but declare "that when it is so, this is, beyond doubt, the most important tariff question that can engage the attention of Her Majesty's Government and the Chambers of Commerce."

The powerful and self-contained empires of Russia and Austria have hitherto resisted the efforts of British commercial diplomacy. But England has discovered a postern by which she hopes to steal within our protective defences; and Canada, lately so despised, looms up into importance as the back door through which free trade may enter our country. Canada already blushes at the ignoble uses to which she is being turned; and in her self-respect and aspirations for industrial and political independence we have our best hopes of the frustration of British policy. — No, not our best hope. We hope in our Senate, enlightened as it will be by the unanimous sentiment of the productive, that is, the agricultural and manufacturing interests of the United States. We hope in the dignity of the House of Representatives, which cannot permit questions of revenue, specially committed to that body by the Constitution, to be disposed of by the treaty-making power. We hope thus to be spared the humiliation of seeing, spread out in the reports of the British Chambers of Commerce, the records of the consummation of the Canadian Reciprocity Treaty, as a crowning proof of the supremacy of British commerce.



ENGLISH VIEWS AS TO COMMERCIAL REGULATIONS BY TREATIES.

(From Mr. Bigelow's "Tariff Question.")

"GENERALLY speaking, all treaties which determine what the duties on importation and exportation shall be, or which stipulate for preferences, are radically objectionable. Nations ought to regulate their tariffs in whatever mode they judge best for the promotion of their own interests, without being shackled by engagements with others. If foreign powers be all treated alike, none of them has just grounds of complaint; and it can rarely be for the interest of any people to show preferences to one over another." — *McCulloch*.

"A commercial treaty debars Parliament from dealing with financial questions as it ought to do, according to its own unbiased judgment, unfettered by any foregone conclusions between this country and France, but with reference only to our own domestic interests." — *Earl Grey, in Debate on the Anglo-French Treaty of 1860.* — See *Hansard*, vol. clvi., 3d series, p. 1118.

"But what is to be thought of a free-trader who approves, in general, of treaties of commerce? Did the honorable gentleman ever read the motion made by Mr. Ricardo, when that eminent person,

skilled in political economy, said, 'We want trade; not treaties of commerce, for they are opposed to our principles'? . . . Why, the very thing itself — a commercial treaty — is a contradiction of your creed." — *Mr. Whiteside: Debate in House of Commons on Anglo-French Treaty.* — See *Hansard*, vol. clvi., 3d series, p. 1640.

SENATOR SHERMAN'S VIEWS OF THE PRESENT TARIFF.

SENATOR SHERMAN, of Ohio, the Chairman of the Senate Finance Committee, is far from being an extreme protectionist. Indeed he has sometimes been suspected of free trade proclivities. His testimony as to the value of the present tariff, which we find in his recent speech at Columbus, will have the more weight with the country. He says:—

"As to the duties on imported goods, I can safely affirm that the present tariff is far more certain, specific, and productive than any ever before existing in this country. In comparison with the tariffs of 1842, 1846, and 1861, it is better in every particular. It is better than the former tariffs in the very direction that it can be still further improved. More of the duties are specific, and the classifications are more simple. Still in these particulars our present tariff laws can and ought to be improved. In every case where the nature of the article will allow, the duty should be specific, and all similar articles should be classified into schedules, and with descriptive words impossible to be misunderstood. These laws ought to be codified, as many additions and changes have been made without specific repeal of old laws. The duties and powers of the revenue officers ought to be defined and simplified, though this was largely done during the last session. This subject of the tariff, which forty years ago threatened revolution, and which for years was the leading division between national parties, has now become a matter of detail, sometimes a question of locality, and frequently is the subject of the meanest demagogism. It should be now treated purely as a business question, — a mode of collecting revenue in the cheapest and easiest way. I do not fear that any material change in the principles upon which the tariff is framed will be made, though new details of rate and classification may be made. As a means of revenue, it has proved its success by furnishing us steadily near two hundred millions of gold a year; and, as a measure of political economy, it has largely contributed to the unexampled increase of all forms of domestic industry,

making us already, with our brief national history, the second nation in the civilized world in production. Surely in this branch of our national politics the Republican party may enter the lists with our old adversaries."

ARTIFICIAL ALIZARINE AND MADDER.

THE most splendid triumphs of modern chemistry are seen in the print-works and dye-house. We believe that we were the first in this country to announce the last and greatest conquest of modern chemistry, the discovery of artificial alizarine, when it was but a mere speck on the chemical horizon. The manufacture of alizarine has, in hardly more than half a decade, attained such vast proportions as to seriously threaten the annihilation of one of the most important agricultural industries of Europe, that of madder. We conceive that it cannot be without interest or instruction to our readers to consider the questions which are now being earnestly discussed in Europe in relation to the part which artificial alizarine is destined to play in the arts, and the effect upon the madder industry.

Without going into technical details, it is sufficient to say that artificial alizarine is a product from anthracene, formerly one of the waste products of coal tar. The original discoverers were German chemists, Messrs. Graebe and Luberman. It has been claimed for this artificial product that it is identical with the chemical principle which gives its coloring power to madder. How far this claim is borne out will appear in the notes which follow. Before proceeding to discuss this question, we will dwell a moment upon the production of madder, extracting some notes made by Dr. Versmann in a very instructive paper read by him before the Society of Arts last March:—

"In the East the madder plant has been known since the earliest times; from there it came to Greece and Italy, thence to the South of France, Alsace, Holland, and Germany. In Holland it has been cultivated more than 300 years; in France it has risen to great importance since the middle of last century, especially in Avignon, which now produces about one-half of all the madder consumed, to the value of about £750,000 per annum. Turkey and South Russia also supply considerable quantities of high quality. Some experiments in cultivating madder in this country have been made in Derbyshire, some years ago, but with indifferent results. The soil, the climate, and the weather have the most decided influence upon the growth of

the plant, and the subsequent development of the coloring principle. The Dutch madder will dye red, but not purple, and the color is not fast. Naples madder dyes good red and purple, but the colors are not fast; that of Turkey dyes good red and purple, and is very fast. France supplies the market with two qualities, called *rosées*, from their dyeing beautiful reds and pinks, and *paluds*, which gives a good purple, besides fine reds, and is the best French quality. The last-named is derived from the fact that the plants are grown on marshy land.

"The cultivation of the plant, and the ultimate separation of the coloring principles, is a matter of much time and uncertainty. The root must remain in the ground for a long time, — in France two or three years, in Turkey five and seven years, — and, after having been dried and coarsely powdered, it must be kept another year or two to develop the coloring principles which are not ready formed in the root.

"For many centuries, and until the beginning of the present one, the root was used direct, and no attempt was made to separate the coloring matters, or to apply them in a concentrated and pure form; but, with the development of technical industry and scientific investigation, the concentration or separation of the valuable constituents gradually commenced. The first step was the manufacture of "*fleur de garance*," madder deprived of all substances, soluble in water, and then dried again, which reduced the bulk to about 60 per cent. The washings contain a considerable amount of sugar, which by some French manufacturers is converted into *cohol*. A ton of madder gives about 15 gallons of alcohol, of rather unpleasant flavor, but well adapted for technical purposes.

"Garancine is madder further treated with sulphuric acid, which destroys part of the ligneous fibre, yielding about 25 per cent, in the form of a fine powder of light brown color.

"Alizarine verte and purpurine are the result of treating madder with sulphurous acid, which dissolves both; after adding sulphuric acid to the solution and heating to 40° C., purpurine separates about half or three-quarters per cent, and on further heating to 100° C., alizarine verte separates about 3 per cent.

"Yellow alizarine is obtained by further purifying this alizarine verte.

"Extracts of madder are mostly obtained by treating the root with boiling water, collecting the precipitates which separate on cooling,

mixing them with gum or starch, and adding acetate of alumina or iron. This is, in fact, a mixture of coloring matter and a mordant, which may be used for printing direct. These are the principal madder preparations, many of which are manufactured in this country."

"The artificial product," says Dr. Versmann, "is mostly sold as paste, which is better applicable than a dry powder, which would not mix so well and uniformly. Of course this paste is not chemically pure; but whereas, two years ago, many samples did not contain more than 5 per cent of alizarine, the quality has now vastly improved.

"Pure alizarine may readily be obtained by evaporating the paste, and then extracting the coloring matter, or by sublimation, as shown by different specimens.

"Great doubts were at first expressed as to the quality of the dye, compared with that of madder preparations; but they seem not to exist any longer. It has been convincingly proved by Boley, Kopp, Schunck, Perkin, and others, that the natural and artificial alizarine are identically the same, and the same results are produced.

"The question of price has also been settled; whereas, not two years ago, the difference was greatly in favor of madder, it is now about the same, in consequence of the greatly increased production.

"There is now one factory in this country [England], founded by Perkin; one in France, and more than a dozen in Germany and Switzerland. Some idea of the extent of this manufacture may be formed from the fact that last year more than 1,000 tons of 10 per cent paste were produced, in value of £500,000; and it is stated that one German firm are preparing to make 500 tons a year."

The peril threatened to the madder cultivation is very distinctly shown in a letter addressed by M. Engel Dollfus, one of the great manufacturers in Alsace, to M. Chevrueil, from which we make some notes.

M. Dollfus inquires how it has been possible for Germany, in so short a time, to create and develop an industry whose products attain a present annual value of 30 millions of francs, and equal in amount 1,000 kilograms per day, especially as the raw material is almost without value. This he attributes mainly to the high scientific culture of Germany, and to the facilities accorded in that country to all who devote themselves to science. He gives the following table of the French exportation of madder, to show how they have been diminished by its rival, alizarine:—

	1878.	1872.
	Kil.	Kil.
England,	698,648	821,974
Belgium,	819,681	1,110,515
Germany,	195,901	323,262
United States,	196,323	82,900
Other countries,	289,127	234,888
	1,696,685	

He quotes from the official statistics published at Berlin a table of the importations of garancine for the first six months of 1872 and 1878, in quintals of 50 kilograms:—

	1878.	1872.
Through the frontier of Prussia,	1,976	6,648
Bavaria,	6,874	9,996
Bade,	219	1,395
Alsace, Lorraine,	1,980	4,727
Other countries,	822	47
	50,871	22,866

These figures show absolutely a very large diminution of the direct products of madder, to be accounted for only on the ground of the substitution of the artificial representative of madder. M. Brandt, a contributor to the Bulletin of the Industrial Society of France, does not anticipate the destruction of the madder industry, although fully appreciating the value of the rival of madder. In reply to the question proposed by the Agricultural Society, "What have the madder cultivators to fear?" he says:—

"It is true that the use of artificial alizarine is constantly increasing, and that the consumption of this product is being made on a grand scale in Alsace, and especially in Germany and Russia. But this consumption of artificial alizarine has not taken place to the injury of the normal consumption of madder. By the normal consumption, we mean the consumption before the introduction of the extracts of madder."

"The introduction of these extracts has opened a vast field for the consumption of madder; because by this means we are enabled to associate the madder tints with a greater number of colors, whilst the articles which were formerly made in false colors are at present made in firm hues.

"By this means we should have been enabled to use more madder than formerly, if the artificial alizarine had not come into competi-

tion with the madder extracts. It is then this increase of the consumption of madder which is threatened by the artificial alizarine.

"The attempt has been made, with more or less success, to replace, in dyeing, madder by artificial alizarine; but we have not yet completely succeeded, except for the violets. As to the reds, the results obtained are less satisfactory; and madder, or rather its derivatives, is still preferable for the red tints.

"Artificial alizarine, such as now furnished us, contains only one of the immediate principles of madder, alizarine. When the artificial alizarine is sensibly pure, such as that of MM. Meister and Lacius, it gives finer violets than the flowers of madder, and advantageously replaces the latter in dyeing and printing, both in respect to vivacity of tone and price. But it is not the same with the reds, for which artificial alizarine cannot at present take the place of madder in all its applications.

"In order that it may completely take the place of madder, there must be further progress in science. Chemistry must succeed in producing artificially one of the other principles contained in madder, — that which is generally called *purpurine*, and which furnishes the very orange-reds. But the problem is far from being resolved; for the first necessary condition has not yet been fulfilled, as we do not yet know exactly the chemical constitution of the orange-red material contained in madder.

"In order to compete with artificial alizarine, we want cheap extracts of madder. This is only a question of price. As to the question of quality regarding the reds, it is wholly in favor of madder. This problem, it seems to us, not impossible to resolve.

"At present the fabrication of the extracts of madder is made upon a quite limited scale, principally in Paris and England. Thus the expense of transporting the raw madder swells the cost of the concentrated product."

The extracts, according to M. Brandt, ought to be made in the places of the production of madder, as at Avignon. M. Brandt thus concludes his paper: —

"We shall never succeed in suppressing the artificial alizarine. Its place is firmly acquired; but the use of the madder colors, whether natural or artificial, increases so rapidly that we may hope that madder will occupy a very important place by the side of the artificial alizarine, and that its consumption instead of diminishing will even increase.

"An artificial *purpurine* not yet existing, we shall find it advan-

tageous to use the extracts of madder giving the utmost possible orange-red, which we may employ alone, or mix with pure artificial alizarine, according to the articles, and thus produce all the tints of madder."

The manufacture of the new dye has already had the effect of doubling the price of coal tar at the gas-works in London, which produce about 60,000 tons a year, "an increase almost sufficient to reduce the price of gas a penny or twopence per 1,000 feet." It has led to seeking for other colors from this cheap material, with encouraging prospects of success.

THE SEA ISLAND SHEEP OF MAINE.

MR. GILBERT LONGFELLOW, of Jonesboro', Me., having addressed inquiries to the editor as to the feasibility of growing the Angora upon his farm, in a letter in which he referred accidentally to a flock of four hundred sheep in his possession, established on an island on the coast of Maine, the sheep "getting their own living all the year feeding in the winter on dried grass, moss when they can get it, twigs from the trees and bushes, and *sea-weed that grows or washes on the shore*," the editor requested Mr. Longfellow to give him more particulars as to this interesting flock, and was politely answered in May last by a letter from which we extract the following particulars. They will interest our readers, as a purely original addition to the natural history of the sheep.

We have not space for Mr. Longfellow's description of his island domain, to read which on this hot summer day is like inhaling a breath of the ocean. It consists of an island situated in Englishman's Bay, south of the town of Jonesboro', of about 1,400 acres, with several hundred acres of the very best tillage land, and about 200 acres of grass pasture. About half the island is heavily wooded with spruce, fir, birch, maple, &c. Several hundred acres which were burned over have come up to birches, the largest of which are four or five inches in diameter. The island is open on the east to the full ocean, which rolls in thousands of cords of sea-weed. The seasons are much milder than on the main. After giving these particulars, which are greatly condensed, the writer continues:—

"Now for the sheep. Five years ago I bought of the former occupant 267 sheep of a mixed breed. I could see traces of the merino, Southdown, and some of the long wool. I have killed and sold, as near as I can tell,

some 25 or 30. Last year sheared a little over 300; some 30 or 40 I did not catch; these with the last spring lambs I thought would bring my flock up to nearly 400 last fall. This, you will say, is small increase. In telling people the story, they say, 'Why do you not keep them at the barn where you can take care of them?' This is easily said; but let's see. If I keep them at the barn, I shall have to feed them about all they want. Now, at a very low estimate, 400 sheep will eat 100 tons of hay. I cut last year 80 tons. Hay has averaged with us for the last ten years over \$20 per ton. This will make a cost of at least \$2,000, — more than the whole flock will sell for. So I think my best way is to let them run, and take as good care of them as I can. I labor under several serious disadvantages. In the first place I do not know how, and if I did I have too much to see to besides. If I could find the right kind of a man that understands the business, and that would be honest and faithful, and work on the farm when the sheep did not need him, I would like to try the experiment for one year. My idea is, that a Scotchman, who was brought up to the business, with a good dog, would be what I want; but I am not in the way to get such a man. You see I do not get all of my sheep to shear. The first year I was here I got all but two, the next all but five; and the number has been increasing, till last year I think there were 30 or 40. This is not a dead loss, for they usually wear their fleeces till sheared, so I stand a chance of getting the wool the next year. I shear quite a number every year with double fleeces, and in one instance the sheep had three fleeces, one on top of the other. I do not know what can be done with such wool, but it sells with the rest. My method is to drive the island thoroughly at least twice: this gives me the main body. Those that are left are scattered, so that as I am at the expense of \$15 to \$20 per day the wool will not pay for catching. When I came to the island, the sheep had paths where they always run. They are nearly as wild as deer; and when we started a flock we could tell which way they would go, and by stationing men at the branch paths, or running across the corner, we could drive them in almost any direction. But the blow of October, 1869, blew down so many trees that it filled up their paths, and also made it impossible to head them, so that now it is next to impossible to get them all. By not getting all my sheep once a year, I cannot control the lambing. When I commenced, I kept all the bucks I could get away from the ewes till the middle or last of November; but I found that sometimes a buck would escape me, sometimes a ewe would escape with a ram lamb, and sometimes a ewe would have a ram lamb after shearing, so now I have given it up and let them all run, and think I gain by it. My sheep now commence lambing in March, and get through by the first of May. I find these early lambs are hardier than late ones. They will stand a snow-storm better than a cold rain, and by coming early the lambs are better able to stand the winter, and the ewes wean the lambs time enough to get recruited before cold weather. I think I lose but few sheep by disease. Sometimes they get cast. I found two the other day in a mire. Some die in lambing, some get washed off the

ledges and are drowned, and I suppose some are stolen, and some die of old age. I have repeatedly sheared sheep without a front tooth. In winter they are divided into flocks of from 15 to 25, and live near a place where they can get to the shore for sea-weed, and into the woods for shelter. Their principal living in winter is some of the varieties of sea-weed, principally what we call dulse. They also eat the branches of nearly all the trees that grow on the island. As I go about the island, I find nearly all the bushes with the ends of the branches bitten off. They like fir better than spruce, are very fond of mountain ash, eating branches as large as your finger; and also the bark elder is a favorite food, and raspberry; also the moss from the old stumps and logs. I had a flock in my field this winter, the snow came deep in March, and I used to carry out hay to them, about 50 lbs. daily to about 50 sheep. After a while they would come up near the barn for it. Sometimes some of the sheep from the other parts of the island would come up where they were eating, but would only take a few mouthfuls, and then leave it. I have several times taken tugs to the barn that were poor and weak, but they almost always die. It seems to be hard for them to get through the first winter, after that they are all right. The wethers keep fat all winter. I spoke about their getting drowned. In the spring, when the tides run out very low, they go out on the rocks and ledges as far as they can get, and sometimes when they are feeding on a ledge the tide will come up all around them. When this is the case, they will not wade through water a few inches in depth, but will stick to the ledge till the tide takes them off. By that time their fleeces are so full of water and heavy, that, although they can swim ashore, they cannot get out readily, but crawl out a little way, and then wait for the water to drain off, and crawl a little farther. If there is any sea going, it washes them back again; and they drown. I have several times driven them off such places before the tide came to them, and they swim ashore and get out very readily.

You ask what kind of sheep I raise. I can hardly tell. My flock at first were every thing mixed. I have bought the largest rams I could find; I have had one or two grade Cotswolds; I had one very long wool sheep, I think it was Leicester. I have thought the Lincolns were the sheep for me, but do not know but the Cheviot would be better. The mutton of these island sheep is very superior. It has none of the mutton taste so many dislike, but resembles venison. I think I must have exhausted your patience by this time, so will stop. If you have any questions to ask or suggestions to make, should be glad to have you do so; or, if you can make it convenient, and would like to, I should be happy to welcome you to my island home. We live in plain farmer style, but such as we have you will be welcome to. I will enclose some samples of wool taken at random from sheep that have died this spring. It is just as it came from the sheep. With many thanks for your kindness, I remain

Yours truly,

GILBERT LONGFELLOW.

THE SILK ASSOCIATION, AND MR. ALLEN'S REPORT.

THE space which we have been compelled to devote to the cotton manufacture, that we might do justice to Mr. Harris-Gastrell's Report, deprives us of the privilege of giving notes upon the American Silk Manufacture, for which so much invaluable material is supplied by the report of the Silk Association of America, submitted by Mr. F. Allen, its secretary. This report presents the usual evidences of Mr. Allen's untiring industry and genius for industrial service. A marked feature of the report is the notes prepared by special manufacturers upon each branch of the silk industry, — a feature which our own Association would do well to imitate.

Mr. Allen states the position of the proposed silk ribbon tariff. It appears that this measure has received the indorsement of the financial committees of Congress, and that it was defeated simply by the dilatoriness of legislation, but certainly, as we can say by personal observation, for the want of activity on the part of the officers of the Silk Association. The measure can hardly fail to pass at the next session.



A UNIFORM SYSTEM OF THE NUMBERING OF YARNS.

WE have been the recipients of numerous communications from Europe upon the subject of a uniform system of numbering yarns. This subject received the attention of a very important congress of manufacturers at the Vienna Exposition. The results of that congress are interesting, as showing the total absence of any uniformity in the system of numbering yarns in Europe. The necessity of such a uniformity is obvious among nations where the commerce in yarns is so vast as it is abroad. We have been requested to take part in another congress, called for definite action on this subject, at Brussels, on the 21st of September. But our importation of European yarns is so small that we have comparatively little concern in this question. Still, we await the decision of the Congress of Brussels with interest, as their decision, if practically adopted, will ultimately form the rule for numbering yarns in this country. A uniform system throughout the world, based upon philosophical and intelligible principles, would be a most important step of progress in the textile industry.

NUMBERS OF GERMAN SHEEP.

DR. F. SPRINGMUEHL gives, in the "Practical Magazine," under the date of August, 1874, a statistical note on the production of wool in Germany: German farmers possess between them 29,000,000 heads of sheep, 14,000,000 of which are of the merino stock, 8,000,000 of native stock, and 7,000,000 of English and other foreign stocks.

Obituary.

PETER ANDERSON; DAVID B. JEWETT; CHARLES A. WHITING.

THE editor, whose sad duty it is to record in our journal the departure of our associates, has never been so vividly reminded that he has come to be among the falling leaves as within the last few months. It is a beautiful revelation of modern Science that the autumnal glories of the many-hued foliage so glowingly displayed in American scenery are not due to frosts and blights. The autumnal tints of the leaves are the evidences of their complete ripening, and are but the same tints shown in the golden and ruddy fruits of autumn.

The ripened leaves among the members of our Association have of late most thickly fallen; but how full are they of autumnal glories,—of evidences that they have perfected the work given to man, no less than to the leaves and fruit which are his types! We have to record the departure of three of our associates, who have gone in the full maturity of their ripened usefulness. PETER ANDERSON, DAVID B. JEWETT, and CHARLES A. WHITING,—we name them in the order of their departure. Political records, which tell us of the men who have occupied the most prominent positions in the public eye, rarely exhibit the lives of such men as these, who have been little known outside of the sphere of their unostentatious duties.

PETER ANDERSON, born in Norway of a good family, having received an excellent primary education, came to this country as common sailor. He at first made the knowledge of drawing which he had acquired at

home available for his support, and executed some excellent views and maps of Washington, which he exhibited with much pride. The step from drawing and engineering to the knowledge of machinery was a natural one. Acquiring this knowledge, he became the principal overseer of the Middlesex Mills. But, finding his position inconsistent with his independence, he established a smaller mill for making carpet yarns, and attained great success in this manufacture. His singular habits of personal economy gave him means for the acts of benevolence for which he was conspicuous. The comparison which he was able to make, from his own experience, of the opportunities afforded in Europe and America to the working men, made him an enthusiast for American institutions, and especially a profound believer in our protective system, and hence a most ardent supporter of our Association. He preserved his relations with his fatherland, actively corresponding with the Swedish government, and sending them all the works on public education published here. He advised that the Norwegian and Swedish emigration seeking this country should be directed to the North-western States. And it is admitted that he was the chief cause of the Norwegian and Swedish emigration which has so much enriched the North-west. No one more heartily admitted this than his intimate friend, the celebrated Ole Bull. It was his privilege within the last two years to visit Norway, where he was welcomed with an ovation which the friendless sailor boy little dreamed of in the grief of parting from his native land.

Mr. JEWETT was a man of a temperament so fine and a modesty so rare that he constantly strove to hide his work. Although the son of a clergyman, and educated for the ministry, he shrank from speaking in public. He therefore entered into the dry-goods business, in which his uncommon taste must have done him much service. Becoming the head of an important house, he accumulated a handsome fortune. Retiring from mercantile business, he became the Treasurer of the Lowell Manufacturing Company, so celebrated for its production of carpets. He also assumed the voluntary and important duties of Treasurer of our Association, and thus we know him. The fine polish of Mr. Jewett's moral nature was never dimmed by trade. His confidential clerk, whose appreciation is in itself a eulogy, says that "Mr. Jewett's heart was tender as a girl's," and that he never did an act in business which the most rigid conscience could not approve. We have the highest authority for the statement that, although very

liberal in his style of living, he spent each year in private benevolence more than the amount of his personal and family expenses.

It was our privilege to know Mr. Jewett not merely as a manufacturer and as Treasurer of our Association, but as a horticulturist. His rare skill and taste were exhibited in the gardens surrounding the house which he occupied in Newton, and in the grounds which he most elaborately planted, on one of the most superb sites in the vicinity of Boston, for a residence which he had planned, but did not live to build. We rejoice that he had the happiness of creation in his own mind, for all that was left for the builder was but the material work of construction.

Mr. WHITING was for many years Treasurer of the Bigelow Carpet Company, and a director for fifteen years in one of the principal banks of Boston, and had a high reputation for sagacity in financial affairs. We have rarely known one who seemed more thoroughly imbued with the sentiment of fidelity to all interests in his charge. Trustworthiness is the word most expressive of his character. Devoted as he was to the particular interests of his business, he had a broad comprehension of public questions in their relations to business, — a habit doubtless cultivated by intercourse with his principal patron, who gave the name to the company of which Mr. Whiting was treasurer. He was the first among all our members to comprehend the consequences of the threatened Reciprocity treaty, especially in its relations to the woollen interests. Our last interview with him was in relation to this question.

Of all our three departed brothers, it may be said that in their social relations with their families, the religious societies in which each took active part, in their private lives, they displayed conspicuous excellence. Devoted outwardly to acquisition, they were each of them munificent in private charity. Their devotion to business did not diminish their interest in public questions, and was subordinate to their duty as citizens and their obligations as Christians.

We would by no means say that devotion to business, in even its most limited forms, is inconsistent with excellence; but it is a growing conviction with us that the charge of great interests of production, such as are involved in large manufacturing establishments, has an effect in enlarging the mind and expanding benevolence, such as is more rarely found in mere trade, banking, and stock dealings. A conscientious man cannot manage interests upon which hundreds

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- II.
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- III.
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- IV.
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BULLETIN

OF THE

National Association

OF

WOOL MANUFACTURERS.

FOUNDED NOV. 30, 1864.

1874.



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BULLETIN

OF THE

National Association of Wool Manufacturers.

VOL. V.] BOSTON, JANUARY—MARCH, 1875. [No. IV.

THE NEW YORK WOOL TRADE REPORT REVIEWED.

WE republish in this number a report of the committee of the New York Wool Trade made to the committee of the Chamber of Commerce on the revision of the tariff, November, 1874. We embody this report in our pages in accordance with our usage to notice not simply the movements which are in accordance with the policy of the association, but those which are opposed to it. A clear view of the position of our opponents reveals their weakness no less than their strength. It is well, too, that the wool-growers, so many of whom read our publications, and to whom the duty of answering this report strictly belongs, should obtain through our pages a knowledge which they might not otherwise have of the arguments adduced against the wool duties.

The character of this report, the highly respectable source from which it emanates, its tone of apparent candor, its recommendations so utterly opposed to the policy of our association, and the influence which it has already had in high quarters, as evinced in certain recommendations in the President's last annual message, compel us to reply to it. We enter upon the task with less reluctance, because the courteous tone of the report will admit only a courteous reply, and because the good taste displayed in the literary execution of the paper permits us to notice

no errors but those of argument. We shall not limit ourselves to following the report in detail or in order, and shall be more concerned in maintaining our own affirmative position of the policy of continuing the present general system of wool duties, with their attending compensations to the manufacturer, than in weakening the negative arguments of our opponents.

The first inquiry in relation to this report—suggested by its title-page—is the authority of the source from which it emanates. Authority has usually more weight than argument, and may be so high as to dispense with reasoning. Does this report speak *ex cathedra* upon wool tariff policy? It purports to have been adopted “at a meeting of merchants and manufacturers engaged in the wool trade.” In looking at the names of the seven members of the committee who sign the report, we fail to see the name of more than one person engaged in manufacturing woollens; and that person, as we are informed, has equal interests in importing. The committee, with this exception and that of a justly eminent manufacturer of *hats*, consists of distinguished merchants, whose authority in the matters of the trade in wool no one would more readily admit than ourselves. But the committee do not speak of their own interests, but of those of the manufacturer and wool-grower. Their position, eminent as it is, neutralizes their authority upon questions of manufacture and production. We attribute to them only the infirmity of all humanity when we say that it is scarcely possible that their opinions are not biassed by their interests. It will not be denied that the profits of the wool trade in our great cities are more enhanced by the system which stimulates importation of foreign wools than by one which encourages dependence upon domestic production. If the merchants in the wool trade, though it may be quite unconsciously, look at the wool tariff with an eye to their commissions, they are but human; but it is that humanity which the common sense of mankind holds to be a disqualification of testimony.

The wool merchants, speaking, as we have seen, with no authority, condemn the present wool tariff as opposed to the interests of wool manufacturers and wool-growers. What do the

representative manufacturers, speaking of their own interests from personal experience, say of this question? Views identical with those of the New York report, though less correctly expressed, were addressed to Congress in 1872, by the late Edward Harris. In order to refute his allegations, the representatives of ninety-six establishments, employing one thousand and seventy-eight sets of machinery, addressed to Congress, in the spring of 1873, the following petition :—

To the Honorable Senate and House of Representatives of the United States in Congress assembled :—

The petition of the undersigned woollen manufacturers, operating respectively the number of sets of woollen machinery written against our names, respectfully sheweth that the present tariff on wool and woollen goods is satisfactory to all the wool-growers and to a large majority of the manufacturers; that it is promoting the growth of wool in all parts of the country, particularly in the extreme West, thereby insuring a constant supply and uniform prices in the future; that it is giving the people cheap goods by reason of intense home competition, and yet manufacturers are not discouraged, but continue to employ their capital and inventive energy in the production of nearly every kind of woollen goods used in the country; and that there can be no good reason given for altering it, except as above.

And the undersigned, therefore, earnestly pray that it may be let alone; and declare on their part that they stand by the pledge they gave the farmers when this tariff was framed, that it should be considered as harmonizing, completely and perpetually, the interests of the manufacturers, the wool-growers, and the consumers of woollen goods.

And your petitioners will ever pray.

The burden of the New York report is that the tariff oppresses the consumers of fine wools. Every signer of the foregoing petition was a consumer of fine wools, the name of not a single carpet or worsted manufacturer being appended. No Western mills, which from their position are confined to domestic wools, are included. All were Eastern manufacturers, close to the markets of foreign wools in this country. At the period when this petition was signed, manufacturers were making the

largest importations of foreign fine wools, and paying the highest prices for domestic wools known since the war. The views of the petitioners were founded upon an experience of five years under the tariff of 1867. The relations of the tariff to manufacturers have not since changed, although "intense competition," so beneficial to the consumer, now presses heavily on the manufacturer. The conclusions of this petition, pronounced by those best qualified to judge, even if somewhat qualified by the recent dissatisfaction consequent upon the depression of all business, must stand as the authoritative judgment upon the wool tariff policy until reversed by the same authority. The views of the wool-growers, enlightened as they have been by the report of the committee, remain unchanged. Their last expression is that made in December last, by the Wisconsin Wool-growers' Association, which is as follows:—

"Whereas a direct and damning blow has been aimed at the agricultural interests of the West by the proposed Treaty of Reciprocity with Canada; and as the wool kings of New York have met advocating a new classification and revision of the wool tariff, &c.,—

"*Resolved*, That the South-eastern Wisconsin breeders and wool-growers (after protesting against the Reciprocity Treaty) hereby emphatically protest against any new classification of the wool tariff to maim or cripple the wool-growing interests of the West.

"*Resolved*, That, whatever are the defects of the present tariff on foreign wools, the market under its influence has reached and maintained a degree of *stability* which has seldom been the case before."

Singularly enough, the report commences its attack upon the tariff of 1867 with the argument that the instability of tariff legislation on wool and woollens is a reason for another change. It produces an interesting table to show that "our woollen industry has had to accommodate itself, during the past fifty years, to fifteen changes in the value of wool, consequent upon as many changes in the tariff." And therefore one more change is desirable! The instability of our former wool tariff legislation was a paramount consideration in the deliberations which resulted in the tariff of 1867. The joint

report of the two executive committees of manufacturers and growers who recommended the present system, speaking of former legislation, says: "The result was that each branch of the woollen industry approached the national councils in invoking legislation from its own point of view. The legislation in relation to this industry vacillated, therefore, as each interest predominated; and instability became its most characteristic feature, and checked its legitimate progress." Says Mr. Bigelow in his address at the American Institute, "It has been through a long series of difficulties and discouragements that our wool manufactures have attained to their present advanced condition. Not the least of these impediments has been a vacillating tariff." The framers of the present tariff saw that the only remedy for instability was to give equal protection to him who raises and him who works up the raw material; to reconcile great interests which had been falsely regarded as antagonistic; and best of all, to repeat the language of Mr. Bigelow, "by substituting united endeavor for hostile action, and a system well considered for capricious ignorance, to give a ground for stability, and a reason to hope for it, which our tariff legislation had long and greatly needed."

We need not enlarge upon the advantages of stability of legislation respecting the wool industry, especially under a system adopted after mature deliberation, recommended by all interested in manufacture or production. Capital is invested, mills are built, and machinery devised on the faith of the permanency of such a system. Business at home, and the foreign trade which furnishes the raw material, adapts itself to it. Such a system should not be radically changed, except for defects universally admitted. The radical change suggested by the New York merchants, if by some inconceivable strategy it should become a law, would encounter the uncompromising hostility of the agricultural constituencies who hold the controlling power in legislation. The temporary success of the advocates of the free wool, or *ad valorem* policy, would be the signal for the renewal of the old warfare between manufacturer and grower which lasted in England for a century, and in this country for fifty

years; and "unstableness and chronical weakness" would indeed become the normal condition of our wool industry. It has been observed by those having large congressional experience, that no branch of the tariff question has presented so many difficulties in practical legislation as that respecting wool and woollens. The contrast under the harmonious arrangements of 1867 is the subject of frequent comment. What but confusion and chaos could result from substituting for legislation founded on calm deliberation and mutual concession an angry scramble for advantage on the floor of Congress, made more bitter by sectional jealousy?

The next charge against the present wool tariff is its intricacies and varieties of duties, and, above all, that it exhibits the ill effects of a complicated system of classification. The objection to the present system of classifying wools, which is a novel and fundamental feature of the present tariff, comes very naturally from those who are more interested in the foreign wool trade than in domestic wool production. The interests of both growers and manufacturers in *their* judgment was found to require varying rates of duties, according to the character of the wools imported. Thus the grower wants only *revenue* duties on carpet wools, because he can more profitably produce Merino or combing wools. He wants a *protective* duty on Merino wools, which can be profitably grown here; and the manufacturer desires to secure by protection an abundance of domestic fine wools. In all former tariffs the classification of wools was made solely according to value. No recognition was made of specific physical qualities or origin. This system of classification opened a wide door for misunderstanding, if not for misrepresentation and fraud, and often defeated the manifest intent of the law to give adequate protection to the American wool-producer. This vicious system of classification was one cause of the former hostility of the wool-growers towards the manufacturers. As an illustration of the operation of the old system, we may cite the fact proved by official returns, that, while it was the manifest intent of the law of 1864 that the minimum rate of duty upon the class of wools most directly competing with our own should be six cents per

pound, many, in fact, came in at three cents; and the average rate of duty upon this class of wools, actually paid, was less than five cents, thus depriving the American producer of his intended protection.

The report says that "Nature has not seen fit to distinguish its product in wool so as to make any law-giver competent to so describe the article as to leave no room for doubt in practically determining in all cases the proper classification." But a European authority, M. Moll, so high that he was made chairman of the jury on wools at the Paris Exposition, regards the wools of the world as naturally and philosophically classified into three great groups, precisely corresponding to our three groups of clothing, combing, and carpet, and other similar wools, previously and independently established in our classification.

Against the opinion of the committee as to the difficulties in executing the present classification, we place the declarations of two officials, who, in fact, have practically applied this classification in appraising the great bulk of the wool imported under this tariff, — Mr. Baush, appraiser in New York, and Mr. Rice, appraiser in Boston. Mr. Baush writes to Mr. Randall in 1868, —

"I think the present mode of classification a decided improvement on all previous modes. I have not found any practical difficulties in its operation."

Mr. Rice writes to Dr. Randall in the same year, —

"In reply to your interrogatory, I would state that we experience no practical difficulty in carrying out the provisions of the present tariff act respecting the classification of wool. The act is sufficiently clear and explicit to render the task with the standards furnished by the Government, and the exercise of sound judgment and discretion comparatively easy. So far as the practical working of the tariff is concerned, the present system is as good as any we ever had."

In reply to our letter, Mr. Baush writes, Jan. 20, 1875, —

"I now reiterate my opinion expressed in my letter to Dr. Randall in 1868, from which you quote, and, after six years of practical experience in carrying out the present wool tariff, do not find such

great obstacles in doing so as the report of the committee of the New York Wool Trade implies.

"So far as the classification of the three classes of wool are concerned, there has been very little difficulty at this office.

"With regard to the article of wool noils of fine wool there have arisen doubts and difficulties as to the class of wool from which the noils were taken; but those doubts have been overcome by placing them all under class 1, which in my judgment is very proper, as they are undoubtedly for clothing purposes, when taken either from Merino fine wools or English blood of class 2."

We are personally authorized by Mr. Rice to say that he adheres to the same opinion as to the merits of the present classification expressed by him in 1868.

Passing by the statement of the committee, that "while fine wool pays from 37 to 88 per cent in the grease, from 31 to 96 per cent if washed, and from 73 to 110 per cent if in a scoured condition," with the remark that their own tables show that the average duty on greasy wools is but $62\frac{1}{2}$ per cent, and that scoured wools as a rule are not and never have been imported to any extent, as there are plenty of washed and unwashed wools, we come to the charge that the consumer of fine wools is restricted to the purchase of only such wools as are favored by the tariff. Of course he is restricted. That was the precise object of the 10 cents specific duty demanded by the wool-growers, and assented to by the manufacturers because they received a specific duty of 50 cents a pound on their cloth, to neutralize this 10 cents on the wool. This compensation, it will be observed, is nowhere alluded to in the report. It says, —

"The duties in question necessarily discriminate against the lowest-priced wools, and, excluding our competition so far as they are concerned, cheapen the supply of many useful classes to the European competitor. Thus, to illustrate, before the year 1867, we were in the habit of importing annually some 30,000 bales of fine River Plata wools. The importation of these wools has dwindled down to from 3,000 to 5,000 bales, and the bulk of this valuable clip now goes to the Continent of Europe, while our manufacturers are forced to use more costly wools for the purposes to which the South American classes were formerly applied."

This statement we are compelled to declare erroneous in the important particular that the tariff alone has caused the abandonment of the River Plata or Mestiza wools.

The following extract from the Circular of Messrs. John L. Bowes & Brothers of Liverpool, of Nov. 14, 1874, whose accuracy the committee will not deny, shows that these wools cost less scoured, or brought to their ultimate condition as wool, than any other fine wools.

Extract from John L. Bowes & Brothers' Circular.

LIVERPOOL, Nov. 14, 1874.

We give the present value in this market of the leading descriptions of clothing wool, with the cost, in gold duty paid, laid down by steam in New York; and the cost when scoured; in each case including all charges and commissions.

	Value per lb.	Shrink.	Cost in N. Y.	Scoured.
Port Philip Superior . .	17d.	53%	50 cts.	\$1.06
„ Average . .	15½	56	45	1.02
„ Cross-bred . .	17	48	50	.96
New Zealand Superior . .	16	54	47½	1.04
„ Average . .	14	57	41½	.97
„ Cross-bred . .	16	50	47½	.95
Cape Superior	10	63	32½	.88
„ Cross-bred	9	67	30½	.92
Monte Video Average . .	10½	61	33½	.85
Buenos Ayres „ . . .	8	70	27½	.90

This table shows that Mestiza wools scoured are from ten to sixteen cents cheaper in the New York market, including all duties and commissions, than Australian wools. The tariff, therefore, does not exclude them as the report declares; and their disuse must be attributed to some other cause. The fact is that they are not used and imported, because they are so weak and so full of burrs as to make imperfect cloth.

Says Mr. Charles Harding, who runs some thirty sets in cloth-making,—

“ All the fine foreign wools suitable for making cloths, or that have to be colored, come from Australia. The South American wools are so full of spiral burrs as to be unsuitable for fancy colors, when dyed

in the wool. We have no process whereby we can clean the burrs from Buenos Ayres wool sufficiently to avoid small particles of burrs on the face of fine goods, except such as will bear submitting to a cotton or wool dyeing process during the last stages of finishing. Black goods will admit of such a process without very materially changing the color; but it is not so with wool-dyed fancy colors, or indigo blues, which would be seriously affected thereby."

Mr. J. J. Robinson, of the American Mills, says, —

"We have for some years been manufacturing Melton cloths. In the manufacture of these goods, we have used fine XX American fleece wool. This wool is now (1871) very scarce. Mestiza wool will not answer our purpose, on account of the burrs. The wool which comes nearest to the American for our use is the Australian wool."

Mr. J. W. Stitt says, —

"In 1865-66, we had a large amount of goods made of Mestiza and other foreign wools, and were continually having claims made against us for imperfect goods. We abandoned the idea of making any more goods of Mestiza, and from that hour to this have never had a claim made upon us for a piece of feeble goods."

Mr. Latham, the eminent wool-grower of La Plata, admits the pooriness of the La Plata wools. He says, —

"Notwithstanding the general fineness of the River La Plata, Merino, and Mestiza wools, they are ranked among the lowest in the estimation of the great home, English market, and this is directly attributable to its bad condition, and to the quality of the wool in point of length and soundness of staple, points in which it is markedly deficient. . . . Fineness without length, strength, elasticity, and softness, is the reverse of desirable, and does not pay."

The remarks of the committee on the double and treble duties imposed on washed and scoured wools are calculated and intended to give the impression that the tariff thus imposes wantonly and needlessly a heavy burden on the manufacturer. This provision is not an original feature of the tariff of 1867, but was adopted from the tariff of 1864. The construction of the Treasury, which doubles and trebles the *ad valorem* duty, we believe to be unwarranted by the law. The duty was doubled and

trebled on washed and scoured wools, because the washed Mestiza wools, the kind then most largely imported, were worth double, and the scoured worth treble, the very dirty unwashed wools. The specific duty on cloth recognizes even a greater difference in the value of the wool in these different conditions. The provision was and is imperatively demanded to prevent evasion of the proper duty on wool. Manufacturers and dealers very naturally and properly avoid paying the double duties on washed wools, and import unwashed wools, selecting the lightest, or those containing the least foreign admixtures. The liberty to import, at the same rate of duty, washed and unwashed wools, would defeat the primary object of the law, which is protection to the American grower. The objection to the double and treble duties is nothing more than an objection to any protective duties on wools, but is no objection to a law which is framed expressly for protection of domestic wool production. Admitting, as we freely do, that it would be temporarily desirable for the manufacturer to buy foreign wools without any restriction, provided he could at the same time preserve the restrictions against foreign cloths, we think the inconveniences of the present system are greatly exaggerated. That this prohibition deprives the American manufacturer of entire classes of useful and necessary wools, such as fine German wools, is not substantially correct. These wools are not required for the cloths made in American mills, and are rarely used for cloths in Europe, as, according to M. Moll's testimony, improved machines and processes enable the manufacturer to make from wools of a lower quality stuffs having as handsome an appearance as those made from this higher priced material.

The hardship of being compelled to buy greasy wools exists mainly in theory. No practical inconvenience results from their use. On the other hand, the growing tendency among the best European manufacturers is an increasing use of greasy wools. The great wool-manufacturing town of Elbeuf buys nearly all its wool in the grease. The wool manufacturers of Rheims wash annually 10,000,000 kilos of fleeces; those of Elbeuf, \$15,000,000. It is admitted that wool keeps in better condition and works better when received at the mill in an unwashed

state. It is more effectually cleaned by the natural soap of the grease or yolk, and consequently takes better dyes. If the manufacturer "washes the grease down his" watercourse, he neglects to apply the modern improvements for saving the pot-ash, which the so-called impurities contain, or to follow the example of Mr. Pomeroy and others who find the wash-waters from the greasy fleeces an invaluable means of enriching their lands. We dissent from the position that "the artificially enforced" valuation of grease wool obliges the manufacturer to give undue preference over fineness and other valuable qualities of foreign wools. The great bulk of the Australian wools which our clothing manufacturers desire are medium or comparatively coarse wools, which correspond with the bulk of American wools. These wools are always comparatively light; the abundance of yolk increasing with the fineness. The very wools which are most profitable to import under this tariff are those which for other reasons would be selected. That the increased demand for grease wool increases the price, is of course true; but the same thing would apply to washed wools, if they were sought for our market.*

Objection is made to the clause in the tariff of 1867 which "raises the duty on fine wool costing over 32 cents, from 10 cents and 11 per cent to 12 cents and 10 per cent." This is not an original feature of the tariff of 1867. Like the provisions as to scoured wool, it was adopted from previous tariffs; the object of this provision was to give increased protection to very fine wools, such as compete with the Silesian wools. The provision is in accordance with the theory of all protective tariffs. The fact cited in illustration of the inconvenience of the provision may be true; but such inconveniences always occur under the system of minimums, or a series of the lowest valuations to which certain specific duties can be applied to given ranges of goods. In spite of its inconveniences, the system of minimums runs through all our general tariff, no

* We would by no means maintain that a greater facility for obtaining washed and scoured wools is not desirable to our manufacturers. This would be materially effected by modifying the Treasury regulation which doubles and trebles the *ad valorem* duties on these wools, which we hope may be accomplished.

other system having been discovered for imposing specific duties according to value.

It is said "that from no defect in our system do manufacturers suffer more than from the astonishing fact that, in spite of our large requirements of foreign wools, our markets hardly ever offer any comprehensive assortment of such wools." Admitting the fact, it is evident that it is not due to the tariff. It is equally true of carpet wools, which have merely a revenue duty, as of fine wools. It is thus conclusively shown that it is the fault of the wool importers themselves that comprehensive assortments of foreign wools are not to be found in our markets.

A feature which pervades the whole report is an exaggeration of the dependence of the cloth-maker upon a supply of foreign wools. As in the following passage: "Nor will it be denied that but few of our mills can at this day be run to advantage without using, to some extent, wools of such working quality as cannot be produced in this country, or are not produced here in sufficient quantity." This is strictly true as applied to carpet and worsted mills. But no complaint is made of the tariff on carpet and worsted wools; and the whole argument of the report is based upon the relations of the wool tariff to the cloth-makers. Statistics obtained in 1865 showed that, of 4,073 sets, 2,171 were employed wholly on domestic wool. This includes carpet and worsted mills. The census statistics of 1870 give the following as the consumption in the woollen mills proper:

	Pounds.
Domestic wool used	154,767,095
Foreign " "	17,311,824
Cotton " "	17,571,929
Shoddy " "	19,372,062
Total material	209,022,910
Total wool consumed	172,079,119

Thus the foreign wool consumed in our mills is only 10 per cent of the whole wool used, and is of less importance even than the cotton and shoddy which enters into their production. These figures show that the very foundation of our wool cloth manufacture is the domestic supply.) Our fabrics are designed

with reference to the peculiar qualities of our own fibre, from which they derive their soundness and durability. Our machinery is adapted for working our own wools; and our best skill, founded on experience of these characters, is exercised in manipulating them. Singularly our imports of foreign wool are made precisely in accordance with economic laws explained by Mr. Colwell, that no nation does or can continue to import and pay for more than one-tenth of all it consumes. What do the interests of the cloth-maker demand, — the system which encourages the domestic production of wool, and admits of importation to the full capacity of importation, or that which looks at importation first, with the certainty of reducing domestic production?

We have the high authority of the report itself, upon a question where it *can speak ex cathedra*, that the system which we advocate and it condemns is really no burden to the manufacturer. Arguing to the wool-grower that the present tariff has produced no appreciable benefit to him, the committee exhibit a table of prices showing "that wools commanded as high prices from 1858 to 1861, when all costing under 20 cents was admitted free, and all costing over 20 cents paid only 24 per cent, *ad valorem*, as they have brought in coin under the present tariff, when the duty is from 37 to 110 per cent on the first cost of foreign wool. The average price from 1824 to 1873 is shown to be 50 cents, about the present price." Wools that are ~~best~~ protected, say the committee, bear the best prices. If so, the best tariff for the manufacturer is that which places on wool the highest duties!

The table of prices of wool, in fact, shows that it is not true, as the free-traders allege, and as the committee argue when addressing the manufacturers, that all duties are so many taxes imposed upon the consumer. The foreign exporter pays a part, if not the whole, of the duty, and domestic competition keeps down home prices. How, then, it may be asked, does the duty on wool benefit the wool-grower? The Wisconsin farmers have given the solution in their resolution. "The market under the influence of the tariff has reached and maintained a stability which it never had before." The tariff has arrested the tide of

the wool surpluses from the southern hemisphere, which otherwise would have poured in upon our shores, annihilating by ruinous prices our own production, — a famine by inevitable laws following the plethora. It is this ague state of alternate fevers and chills which paralyzes industry. It is the highest merit of protection that it gives an equable and healthy tone to the industrial system, checking the undue foreign imports, which are to industry what miasmas are to the human constitution.

The report assumes that there is a peculiar "depression and suffering in the wool industry of this country, due to the oppression of taxed wool, from which other industries are exempt." Is there not equal depression at this time in the cotton manufacture, and vastly more in the iron manufacture? Is there greater depression in the woollen industry than can be accounted for by the panic of last year, the present want of financial confidence, and over-production? The fact is certainly remarkable that we hear of no failures among the woollen manufactures. The committee, with commendable candor, admit, as partial causes of depression, the influence of fluctuating measures of value, the influence of last year's money panic, and "*an over-production of all fabrics which a momentary demand has made profitable.*" The latter admission logically drives them to the most radical of free-trade propositions; viz., that the interest of manufacturers consists in making goods so cheap that they may enter into free competition with those of all other nations in the markets of the world. The report says, —

"An over-production sometimes happens to manufacturers in Europe; but they can relieve themselves of their surplus stock at a comparatively small sacrifice, by consigning their goods to foreign markets, where their cheapness has already introduced them. Our manufacturer, having made his goods out of highly taxed wool, has no such outlet for them, and is compelled to await the slow operation of time, or submit to a heavy sacrifice by forcing his surplus on the home market in competition with his similarly situated neighbors."

This passage is italicized in the report, and, it may be presumed, is thus marked as the knub of the argument.

We protest against the reasoning, as that of the baldest free

trade. It contemplates the British system, which abandons the home trade for that of the world's markets. It is a system in which cheapness of production is the all-important requisite. "When one has to contend with the whole world, he must sell cheap," says a French free-trader. It contemplates the reduction of our wages to European standards, and of our workmen to European degradation. It admits the sixty million starving workmen of Europe into unreserved competition with our own. It contemplates the annihilation of all the small mills, and the introduction of vast establishments, such as those of England, with a specialty of production carried so far as to make not only one kind of yarn, but one and the same number. It involves the contraction of our home market for manufactures, since the capacity to consume goods necessarily follows the lowering of wages, as the home consumption of cotton by the people of England has fallen off 35 per cent in three years under her free-trade system.

But the system is simply impossible in this country, from the popular nature of our institutions, and the cheapness and abundance of land. Men who labor will not and need not accept the wages which rule in Asia and Europe, so long as they can become proprietors themselves. All the prices of the country become adjusted to the high rate of compensation of labor, and a higher range of general prices must prevail than in any civilized country. The high prices thus induced in all the raw materials as well as labor of manufacture, added to the high rates of interest and the local taxation, greater than in any country in the world, will for many years to come make it impossible for us to export in general manufactures, in competition with European manufactures. With all the advantages of a home supply of raw cotton, we have succeeded in exporting cotton goods in only limited quantities, and that as a more convenient means of exchange. These exports are now supplanted by cheap British imitations. How, then, can we export woollen goods, the raw material for which we must obtain abroad, and compete in cheapness with the ordinary goods sent from Europe? We may reach such excellence under a protected system, that limited

supplies of our fabrics may be taken abroad on account of their superiority, independent of price, as all-wool French merinos go into all countries, while in cheap dress goods Roubaix cannot compete with Bradford, and as our superior drillings were taken in China till supplanted by cheap imitations with American marks, and as Minnesota blankets are sent to supply the sleeping apartments of the palace cars introduced by American ingenuity. We may compete in superiority induced by our protective system, and the ingenuity developed by our patent system, which is but another form of protection. Our pianos, sewing-machines, agricultural machines, axes, and shovels are taken abroad, because they are the best in the world; but with foreign goods of the same grade we never have competed, and never shall till all our public land is occupied, and our popular institutions are changed.

So far from our exports of manufactures showing a power to compete with Europeans in general manufactures, as is often urged, it can be demonstrated that such exports as have been successful have been so from special and exceptional causes. Our cotton drillings were taken in China because the article was first made and introduced by Americans; and their use was continued, until stopped by British frauds, from the fixed habits of the Chinese. Our pianos are exported because of the superiority of construction given by our dry climate. Our firearms and sewing-machines compete with the European, because made more cheaply on the American system of interchangeableness of parts, not yet adopted by Europeans. The Minnesota blankets have gone into England with the palace cars introduced by Americans. Our axes and shovels go abroad, not only because they are superior, but that they are cheaply made by American inventions. Mr. Harris-Gastrill, the best and most recent English writer upon our industries, says: "There can be little doubt that the celerity with which every advantage of improved process or labor-saving machinery is brought out and then introduced into general use by the Americans, is owing to *the constant pressure of high rates of wages*, and the comparatively certain protection of capital invested in inventions." Thus our

exports of manufactures are the consequences of our protective system, and are the overflows of a stimulated industry.

To open the markets of the world to our manufactures is the sole panacea which free trade offers for our industrial maladies. A moment's reflection ought to show manufacturers the illusive-ness of this promise. Free trade proposes to make our industrial competition abroad possible by diminishing the prices of all commodities which enter into our manufactures. It is true that under a free-trade system the prices of commodities would respond at once to the change from a restrictive system. But there are certain material conditions affecting the cost of production which would not so respond, such as the disparity in wages, in local taxation, and rates of interest. We have already shown that, from our abundance of land, labor need not and will not submit to material reduction of wages. We have Mr. Wells's authority for the statement that in the wool manufacture the excess of our wages is from 25 to 58 per cent, and that over France, Belgium, Prussia, and Austria the average excess is 100 per cent. In regard to disparity in local taxation, we have the same authority for the statement that in Great Britain and in the cotton manufacture, for example, "local taxation extends only to the rental value of the buildings, and does not in any way regard the value of the machinery which may be placed in such buildings, or the capital employed in its workings;" while in this country the aggregate of local taxes on manufacturing corporations reaches, in not exceptional cases, to over four per cent upon the capital invested. There is the same authority for asserting that the capital required to build a mill in the United States is double the amount required for a similar purpose in Great Britain. In regard to the third condition of disparity, it is too well known to need citation of authority, that the rate of interest on capital, the basis of all business, and the essential condition of success in the creation and conduct of manufacturing establishments, is, on an average, double its rate in England and in the other manufacturing companies of Europe. Given the coveted condition of free foreign wool, and all other raw material of manufacture, but with the inevitable decline of

domestic wool supply, and with the conditions of disparity presented still remaining, let the committee of the New York Wool Trade explain, if they can, how our cloth-makers can attain prosperity outside of their own protected market.

Until this question is satisfactorily answered, we must continue to regard the home market as the only resource of our wool manufactures. Our consumption of woollen goods proper, domestic and imported, is only four dollars per head. As Mr. Colwell, who has studied this subject with his usual care, says, "It is quite apparent that this country has never had a full supply of such woollens as are needful for health and comfort. According to the range of consumption of our population, and the amount of comforts enjoyed, the consumption of woollen goods should not be less than double the present rate. To complete and adjust the entire circle of national production, sheep husbandry should be stimulated until our flocks shall be doubled, and our supplies of wool shall exceed 200,000,000 pounds, and our consumption of woollen goods, domestic and imported, shall be equal to ten dollars per head." This consumption can only be brought about by the increase of the purchasing power of our whole people, and the firm establishment of that general national policy which shall secure to the working and great consuming class full employment and adequate reward for labor.

The most plausible charge in the report against the tariff of 1867 is that it has signally failed in its ostensible object of giving protection and encouragement to wool-growing. The statement is made that the clip of fleece wool in the States east of the Mississippi has been reduced from about 140,000,000 in 1867 to a quantity estimated at not above 115,000,000 lbs. To this the wool-grower might reply, while frankly admitting that his too sanguine expectations have not yet been realized, that the policy of protecting wool is not to be determined by the last six or seven years alone, but by the period commencing in 1861, when the first protective measures in favor of wool production were adopted. In 1860, under a free-trade policy which had lasted since 1846, the wool production had reached only 60,511,343 lbs. In 1874, under a protective policy con-

tinued from 1861, it has reached, according to the statistics of the accomplished chairman of the committee, Mr. Lynch, 178,000,000 lbs.

They could show that the admitted temporary decline in wool production in the older States is due to causes outside of the tariff, to a withdrawal of the stimulating influences of the more effective protective period of the war,—a withdrawal which was felt as well by the wool manufacturer as the grower,—but mainly to the fact that increased value of the land for other purposes made the pastoral sheep husbandry unprofitable. They could show that sheep husbandry had only changed its location; while declining in the older States, it had made in the Pacific States a progress truly marvellous. If the decline in the older States is to be attributed to the tariff because coincident with it, so must the progress on the Pacific. The exports and consumptions of Pacific wools amounted in 1868 to 15,000,000 lbs.; in 1870, to 23,000,000; and the estimates for this year reach the imposing figure of 39,000,000. Thus there is not only an increase more than twofold, but an ascending ratio of increase which opens a most hopeful prospect of a supply, more than commensurate with the falling off in the older States. This wool, as well as that in Colorado and Texas, is rapidly improving in quality, and its principal defects are being remedied by improved cleansing machinery. Can there be any reasonable doubt that this ascending progress was encouraged by the protection of 1867, or that the decline in the older States due not only to the causes above mentioned, but to a depreciation of prices throughout the world, was modified by arresting the flood of imports from the southern hemisphere. In spite of the tariff, the wool industry in the older States was depressed; without it, it might have been annihilated.

In this connection we may consider an argument, not indeed advanced in the report, but often urged elsewhere, that the abolition of wool duties is demanded by the example of all other manufacturing nations. The example most frequently cited is France, which still retains protection on its manufactures; and French authority is cited for the statement that "wools are

always lowest in periods of high protection." No other answer to this need be given than the testimony of M. Pouyer Quertier, a wool manufacturer and recently Finance Minister of the French Republic, given in 1870 before the Parliamentary Commission on the Economic Regime of France. He says,—

"The production of wool has diminished in France, since 1860, about 15 per cent. He denies the benefit which France has derived from the suppression of the duty on wool. We ought to maintain a charge upon foreign wools equivalent to that which burdens indigenous wools. There should be a compensatory duty. As a combor of wools, he demands a just compensation. America in 1850 produced fifty-two million pounds of wool; in 1860, sixty million; and in 1868, one hundred and seventy-seven million. This was the result of the protective duties established after the war. We ought to impose upon foreign wool a duty of from 12 to 15 per cent. In 1869, he imported wool from La Plata at ninety-two centimes per kilogramme, which yielded 31 to 32 per cent. He did not ask for protection, he wanted only compensation; it is better to relieve alimentation than vestiture. The wools obtained from Dijon cost him more for transportation than those from La Plata. We should place a duty upon the raw material, and increase by a corresponding sum the duty on the manufactured article. The production of the wool industry of France has diminished from 7 to 8 per cent relatively to its fabrication in former times."

Nothing is more noticeable in this remarkable testimony, which comes from so high a source that it cannot be impeached, than the profound argument contained in the epigrammatic sentence, "*It is better to relieve alimentation than vestiture.*" Cheap clothing is of vastly less importance to a people than cheap food; and yet, for reasons which we need not now go into, the cost of necessary clothing every year becomes less, while the cost of food as regularly increases. Sheep, from the facility with which they are matured, the rapidity of their increase, and their treble use for raiment, meat, and manure, are the most available means of supplying a deficiency of animal food. Without her sheep England would starve, as they furnish the chief supply, while diminishing the price of all other animal

food. Hence English sheep are grown primarily for mutton, and the wool is only secondary. In this country the increase of sheep is fostered by encouraging the growth of wool. Thus we are able to draw a supply of mutton from thirty million sheep. The influence of that supply in diminishing the cost of all animal food is too obvious to need enforcement. This is a consideration which addresses itself to every individual in our population. The cost of animal food per head is certainly ten times that of wool clothing, which is but four dollars per head. Assuming that the whole duty on the cloth is a tax on the consumer, which we believe to be not true, and that sheep husbandry and the supply of mutton are stimulated by protection, we may reasonably infer that at least the whole duty on the cloth is reimbursed to the consumer by the diminished price of food resulting from the duty on wool. The views here suggested have not received enough consideration. The increasing dearth of animal food is a subject of grave apprehension in Europe. The Society of Acclimation of France, whose primary object is to remedy this evil, is the most popular society on the Continent. The increased culture of sheep is urged upon the French agriculturalists as a national necessity. Even the Merinos are converted into mutton sheep. Their early maturity is brought about by high stall feeding, and they are killed as soon as they are fat and mature. If protection of wool increases sheep husbandry and the food supply of our whole people, the question of wool duties rises above the partial interests of manufacturers and growers, and becomes one of national importance.

There remains but one point in the report which we feel called upon to answer; that is its specific recommendation of an *ad valorem* duty of 25 per cent on all wool. Of course, every manufacturer, looking at his immediate interests and ignoring the importance of stimulating the home wool production, would be glad to have a low *ad valorem* duty on wool provided he could keep the specific duty on foreign cloth. But does any man of sense believe that this can be done with the present sentiment in the agricultural communities, the controlling power in legislation? The *ad valorem* system, if adopted at all, must be made

to apply to both woollens and wool. We had an experience of this system in the operation of the tariff of 1846, which imposed in the main a 31 per cent duty upon both wool and woollens, and burdened the manufacturer with the whole duty on the wool without compensation. The most eminent and practical writer on our wool manufacture declares that "under the baleful operation of this tariff, the growing of wool remained almost stationary, and many of our largest manufacturing corporations were made bankrupt." This lesson should not be forgotten.

The final and most conclusive answer to the whole argument of the report is the fact demonstrated by official tables that the tariff of 1867 has effectually accomplished its purpose of checking the importation of foreign woollens and in encouraging American woollens even to over-production. We have more than once published the tables which support this. The facts are so important and conclusive that we shall repeat them, that the lesson which they teach may be fully impressed upon manufacturers and legislators. It is due to the wool merchants to say that their significance was first pointed out by an eminent member of their body, Mr. Bond. The table, compiled from one issued by the United States Bureau of Statistics representing the general imports of the country for five years before the passage of the tariff of 1867, and for five years under its operation, shows these facts: The total imports of the country for the first five years of the operation of the tariff of 1867 increased 45 per cent; the importations of carpets increased 119½ per cent; the importations of worsted and dress goods, 40 to 57 per cent; while the imports of *all other woollens fell off 22 to 31 per cent.*

This falling off of importations was supplemented by domestic production, as the census of 1870 shows that, in the middle year of the five, the value of woollens proper manufactured in the United States was \$155,405,308. Thus, the very branch of the wool manufacture which according to the committee had suffered most from the tariff is proved by these figures to have been most benefited by it. But they may say that the tariff was injurious through the undue stimulus it gave to competi-

tion, and that our protection caused over-production. With over-production staring them in the face, they ask for still more protection. Reduction of duties on raw material is but another form of protection. Would not competition thus revived soon neutralize all the benefits of the new stimulus?

In defending as we do the tariff of 1867, we claim for it only that it was as good a scheme as could then be devised, or as we could with the present light now recommend, for the protection of all branches of the American wool industry from foreign competition. We reiterate the sentiment expressed by the representative wool manufacturers and wool-growers in joint convention at Syracuse, in 1871: "It is a matter of surprise that in so brief an act, occupying scarcely two pages in the statute-book, provision should have been made for all departments of the industry of woollens, including a dozen or more entirely distinct branches, and with such equality that no one can intelligently boast of special favor, or complain of neglect." But we do not claim for it that in itself it could give prosperity or prevent the consequences of competition, a defective currency system, or bad economy in manufacturing. Neither do we claim for it that it is perfect in its details, nor that in these respects it may not be improved by revision. The minority of fine cloth manufacturers who are dissatisfied with certain portions of the tariff is too respectable not to make it exceedingly desirable that efforts should be made to reconcile them. We can conceive of concessions which might be made by the wool-growers without real injury to their interests or the principle of the present tariff. We have always been of the opinion that a higher relative duty ought to be placed upon fine high-priced cloths, as was done in the tariff of 1864. This would be justified by the same argument which defends the high duty on silk goods, that it is a tax upon luxuries. The duty on wool consumed in the hat manufacture requires compensation. The present duty on felts and feltings is inadequate, and requires modification. The doubling and trebling of the *ad valorem* duty on washed and scoured wools, if not corrected by the Treasury Department, as it might be under recent judicial decisions, should be remedied

by law. But, if the details of the tariff are to be modified, the only right way, and we may add the only practical way, of accomplishing it is through the joint recommendation of the wool-growing and wool-manufacturing interests. Nothing but a *joint* recommendation will be recognized by Congress. Another conference of these interests may be desirable. If such a conference should take place, it is proper to say that nothing in this article should be construed as an admission by the National Association of Wool Manufacturers against the propriety of such recommendations as they may then make in behalf of their own peculiar interests.

NEW YORK WOOL TRADE.

At a meeting of merchants and manufacturers engaged in the wool trade in the city of New York, held at the Rooms of the Chamber of Commerce, Nov. 27, 1874, the following Report was unanimously adopted : —

REPORT.

The undersigned Committee, appointed at the meeting of the Wool Trade of this city held October 26, have given the subject with which they were charged their careful consideration, and respectfully report as follows : —

The resolutions of the Chamber of Commerce, on which we were invited to act, called for the suggestion of such amendments to our present tariff laws with regard to the article of wool as would tend to relieve them of their objectionable and vexatious features, without disturbing the rates of duties now established.

Having accepted this task, we started upon our investigations with the honest intention of discovering how far the purposes thus prescribed could be accomplished. The hope of success, if ever seriously entertained, was, however, speedily dispelled by the consideration of the present duties on wool, and the consequences inseparable from the policy embodied in them. Whatever relief other branches of trade and industry may have reason to expect from a better adjustment of duties, and from a simplification of the manner of their

assessment and collection, we could not escape the conviction that the woollen industry of this country would derive but an insignificant benefit from any action of Congress confined within the limits proposed by the Chamber of Commerce.

The few suggestions that can be made in this direction would hardly call for an elaborate report; but in view of the important interests concerned in the wool tariff, we deem ourselves justified, if, in laying before you the insurmountable obstacles that lie in the path of any effectual reform, so long as the present high duties are to be maintained, we go a step farther, and also point out what seems to us to be the only possible reform of our wool tariff, which will prove in any degree effectual.

TARIFF OF 1867.

A reference to the annexed table, Appendix A.,* showing the different rates of duty on wool imposed by the successive tariffs of the United States, will serve as a fitting introduction to our remarks.

This table shows that our woollen industry has had to accommodate itself during the past fifty years to no less than fifteen changes in the value of wool, consequent upon as many changes in the tariff, and that our present tariff imposes on most classes of wool the highest duties that have ever been laid on the article. It also exceeds all former tariffs in its variety of duties and in its intricacies, inasmuch as it establishes fourteen different rates of duty, mostly specific and *ad valorem* combined, and prescribes a system of classification nominally based upon the well-known uses to which each parcel might appear best adapted, but essentially dependent on the origin, blood, and character of the wool as described in the act of 1867. The difficulties attending such classification are officially acknowledged in the interesting report made to the Secretary of the Treasury in 1873, by Mr. GEORGE W. BOND, of Boston, who acted as expert for the Government in preparing the 168 different standard samples deposited with the appraisers of Boston, New York, and Philadelphia, for their guidance in determining doubtful cases.

Proceeding farther in our statement of facts, we may be permitted to refer to another table (Appendix B.), showing what the present duties on the principal kinds of foreign wool amount to per pound, and what purely *ad valorem* rates would correspond to these duties,

* The appendices are omitted in this republication.

our calculations being based on the prices that have been ruling in the respective markets of production within the last seven years.

This statement shows our present duties on wool to vary from 18 to 110 per cent on the first cost and charges at the port of shipment ; it also shows the burden to be very unequally distributed among the different classes of wool, carpet wools being subject to the comparatively moderate rates of 18 to 39 per cent *ad valorem*, averaging probably not over 30 per cent ; while fine wool pays from 37 to 88 per cent in the grease, from 81 to 96 per cent if washed, and from 73 to 110 per cent if in scoured condition.

Having thus explained what are the legislative restrictions under which our wool trade and our large woollen industry are allowed to work out their life and progress, we next proceed to show the effects, which, in our opinion, result from this condition of things. In doing this we have to divide our subject, and consider, first, the effects of the existing tariff on our woollen interest, and, secondly, its results to the wool-grower, it being generally understood that our high duties were imposed mainly for the benefit of the latter.

EFFECT OF THE TARIFF ON OUR WOOLLEN INTEREST.

In considering, first, the effects of our tariff on the woollen interest, we have to deal principally with the consumers of fine wool, since carpet wools bear but a moderate duty, and are divided only into two classes, according to their first cost. Fine wools, on the contrary, are subject to a variety of high and chiefly specific duties, having little regard to the first cost. This obviously restricts American competition in foreign markets to such kinds as are favored by the tariff. The duties in question necessarily discriminate against the lowest-priced wools, and, excluding our competition so far as these are concerned, cheapen the supply of many useful classes to the European competitor. Thus, to illustrate : before the year 1867, we were in the habit of importing annually some 80,000 bales of fine River Plate wools. The importation of these wools has dwindled down to from 3,000 to 5,000 bales ; and the bulk of this valuable clip now goes to the Continent of Europe, while our manufacturers are forced to use more costly wools for the purposes to which the South American classes were formerly applied.

The American manufacturer is farther restricted in the purchase of a cheap and suitable supply of foreign wool by the fact that double and treble duties are imposed on washed and scoured wools, and by the construction put by the Treasury Department upon the clauses of

the tariff prescribing these rates. It may well be doubted whether it was actually intended by the framers of the tariff that not only the specific, but also the *ad valorem* duty should be doubled and trebled on washed and scoured wools, since 10 per cent *ad valorem* would, owing to the higher cost of such wools, of itself subject them to about double and treble per pound the duty on grease wool. This question has once been tested in a United States court, and decided in favor of the simple *ad valorem* rate; pending an appeal, however, the instructions of the Treasury Department to this day assess the double and treble *ad valorem* rate. The effect of this ruling is to make washed wool, Class I., and scoured wools, Class I. and II., pay much more than double and treble per pound the amount paid by greasy wools of the same class. These wools are, therefore, effectually excluded from our market; and this prohibition deprives the American manufacturer of entire classes of useful and necessary wools, such as the fine German Merino, which are not offered in the grease. While Europe takes the larger proportion of its supply of colonial wools in the washed and scoured state, our manufacturer is thus forced to pay freight and other charges on wool loaded with 50 to 75 per cent of impurities, which he immediately washes down his watercourse.

Another injurious effect of being obliged to buy grease wool, and of paying a heavy specific duty on its impurities, is, that the American manufacturer is thereby obliged to give undue preference to light condition over fineness and other valuable qualities of the wools offering in foreign markets. This artificially enforced valuation of fine grease wool is a well-known feature that distinguishes our market from the markets of other countries. Ignorance only will deny that it is a detriment to our industry to be obliged to concentrate its competition in foreign markets on the always small proportion of lightest grease wools, while all foreign competitors, having to pay duty neither on wool nor on grease and dirt, can buy the heavy wools offering to much better advantage.

The clause of our tariff which raises the duty on fine wool, costing over 82 cents, from 10 cents and 11 per cent to 12 cents and 10 per cent *ad valorem*, likewise injures our manufacturer without apparent benefit to any interest, not excepting even that of the revenue. The present condition of the wool markets furnishes the aptest proof of this assertion. Fine light Australian and New Zealand wools having become scarce on this side, and there being no direct supply from those countries to be obtained before next spring, some 8,000 bales of these wools had to be ordered for American account from the late Septem-

ber auction sale in London. It happened that prices had reached the point where the first cost of such wools as were wanted exceeded 32 cents; the American buyers could not pay above that price; in fact, it was not safe even to go as high as 32 cents, since any further advance of the market between purchase and shipment would have obliged the importer on this side to add that advance in value to his invoice, and to pay 12 cents per lb. instead of 10 cents specific duty. The wool, however, was wanted; and nothing else could be done, under the circumstances, than to give way on quality or condition, and to bring in wool that was inferior to what had been desired, but sure to pass at the lower rate of duty. A similar embarrassment may at this moment be experienced by the American buyers in the Australian market, where, since the opening of the annual auction sales, the light Port Philip wools, suitable for the American market, have advanced up to the limit within which our tariff allows us to compete for such wool.

The necessity of establishing classifications must always be inseparable from a variety of duties; but no law will ever be found equal to that task, nor will the strictest conscience of the appraiser ensure justice in its application, or prevent the ill effects of such a complicated system. Nature has not seen fit to distinguish its product in wool so as to make any law-giver competent so to describe the article as to leave no room for doubt in practically determining in all cases the proper classification. The innumerable varieties of wool run into each other to such a degree that it frequently becomes impossible even for an expert to say where a certain wool ceases to be worsted and becomes merino, where a carpet wool begins to contain fine wool, or where a washed wool becomes scoured. Such doubtful classes of wool, however desirable and valuable they may be, are practically excluded from our market; and, if an importer brings them in, he does so at the risk of having to re-export them, since the appraiser will always feel bound to decide doubtful cases in favor of the higher class. The advantage ostensibly given by our tariff to worsted wools of English blood, Class II., by admitting them washed at the simple rate of duty on fine unwashed wool, becomes practically of very limited value to the general importer, because the appraiser may quite possibly find a trace of merino blood where no ordinary buyer could discover it. It is also impossible under this system to secure at the different ports of entry a uniform practice in determining the classification of doubtful wools, and cases will necessarily occur where invoices are passed in one port at a lower duty than they are assessed at in another.

The valuable article of noils appears to have been overlooked in the framing of our tariff, and becomes practically prohibited, so far as the medium and fine qualities are concerned, by being treated as fine wool. While the washed English worsted wools, with the noils in them, come in at the simple rate of duty on combing wool, Class II., the noils combed out of the same wool, if brought here by themselves, are subject to double or treble duty like clothing wool, Class I., and are therefore made inaccessible to our manufacturers.

From no defect of our system do our manufacturers suffer more than from the astonishing fact, that, in spite of our large requirements of foreign wools, our markets hardly ever offer any comprehensive assortment of such wools. Any one acquainted with the advantages connected with a near market offering a steady supply of all kinds of wool — we do not say like that of London, but even like those of Antwerp, Havre, and Berlin — must be struck by the insignificant part which the American markets are condemned to play. And to what other cause can this remarkable inferiority be referred than to the difficulties placed by our tariff in the way of furnishing our market with a regular supply of wool? The importation of foreign wool has not decreased since 1867; but there has certainly been a change since that period in the manner of carrying on the business, which is detrimental to our industry, particularly to the small manufacturer.

The uncertainty of our markets and the absence of any regular supply, also, have caused that occasional sudden increase of importations, those violent advances in value and no less violent reactions, from which we have suffered so much within the past few years.

AD VALOREM DUTIES REQUIRED.

In connection with the above-stated facts we may here anticipate an argument that will be brought to bear on our conclusions, by pointing out that specific duties, whatever advantages they may offer with regard to other articles, must necessarily prove inadequate and injurious when applied to an article like wool, that varies so much in value. The common objection, also, to *ad valorem* duties — their liability to encourage undervaluation — can be urged with but slight reason against *ad valorem* duties on wool, as the value of the different classes and grades is well known all over the world, and is publicly reported in prices current by every foreign mail.

In addition to these remarks on the injurious effects of our tariff on the woollen interest of the United States, we cannot but point in few

words to the flourishing woollen industry in the neighboring Dominion of Canada, which, with its three millions of inhabitants, now imports or consumes as much Cape wool as the whole of our country, with its forty-two millions of people. Whoever desires to study the causes of depression that weigh upon our manufacturing interest will do well to inform himself of what our neighbors are accomplishing with free trade in wool and a revenue duty of only $17\frac{1}{2}$ per cent *ad valorem* on woollens of all kinds.

DEPRESSION OF INDUSTRY.

That our woollen interest is depressed and suffering, and that in reality it has never reached that degree of stability and security which would be commensurate with its magnitude and importance,—with the amount of capital invested in it, and with the indomitable energy that has so far preserved it from serious decline,—are facts too well known to require any proof at our hands.

We do not pretend to disguise the truth that there are other causes, besides our tariff, that lie at the bottom of this weakness. In common with all other interests, our woollen industry no doubt suffers from our fluctuating measure of values, and from the improvidence and extravagance which it has engendered, as also from the effects of last year's money panic; nor will we ignore that special cause affecting our interest which lies in the fact that the extraordinary activity prevailing during our war, and immediately after, brought with it a sudden and large increase of machinery, which we have never yet succeeded in keeping employed for any length of time without creating a surplus stock of some one class of goods or another. But our European competitors have had their wars and their panics; and some of them, like Austria, labor under a depreciated currency as bad as our own. Nevertheless, we hear of no such long periods of depression in any manufacturing district of Europe, nor of any such weak and unstable condition prevailing in their woollen industry, as are here witnessed. The character of the products of those countries, which no tariff, it seems, can keep away from us, rather proves their steady progress in the art of manufacturing; and the increasing consumption of wool in Europe proclaims the prosperity of that industry in spite of all drawbacks. In Europe, the manufacturer invites and obtains success by adhering with steady attention to the special fabrics he has undertaken to make, and in which he has acquired excellence of skill; here changes and experiments are the rule, and steady prosecution of a certain kind of work is the exception. Our manufacturers are prone to rush into the production

of such classes of goods as a momentary demand has rendered profitable, and the invariable result is an over-production of those fabrics. *Such an over-production sometimes happens to manufacturers in Europe; but they can relieve themselves of their surplus stock at a comparatively small sacrifice, by consigning their goods to foreign markets, where their cheapness has already introduced them. Our manufacturer, having made his goods out of highly taxed wool, has no such outlet for them, and is compelled to await the slow operation of time, or submit to a heavy sacrifice by forcing his surplus on the home market in competition with his similarly situated neighbors.*

CAUSE OF DEPRESSION.

What, then, is it that causes an unstable and chronically weak condition of this industry, in a country whose climate more, perhaps, than any other, calls for woollens as the chief article of human clothing? What else can it be, but that suicidal policy embodied in our tariff laws, which, under the pretext or illusion of fostering the interest of the wool-grower, prevents natural and healthy development, and imposes conditions under which no modern industry can possibly thrive?

In closing this part of our argument, we beg leave to refer to sundry tables (Appendices E., F., G.), giving statistics and information bearing on various points above treated.

EFFECTS OF THE TARIFF ON THE WOOL-GROWER'S INTEREST.

Before we enter upon an examination of the effects of our tariff on the wool-growing interest, it will be well to consider that neither our country nor any country in the world does or can produce to advantage wools of all kinds and grades. It must farther be borne in mind that in order to produce the endless variety of woollen fabrics demanded by our times, with the highly improved machinery now in use, and with the active competition among all manufacturing nations, the free and unrestricted selection of the most suitable classes and grades of wool has grown to be a matter of much more importance to the manufacturer of every country than it used to be in old times. Nor will it be denied that but few of our mills can at this day be run to advantage without using, to some extent, wools of such working quality as cannot be produced in this country, or are not produced here in sufficient quantity. The simple fact that, even under our present tariff, we have annually imported from 15 to 60 million pounds of fine wool, sufficiently proves these positions. The question of duty on fine wool can, therefore, never be a simple ques-

tion of protection or no protection to the wool-grower. If this were the real alternative to be decided, the wants, not only of our manufacturing interest, but of the whole people, as consumers of woollens, would stand opposed to that comparatively small class of farmers who make wool-growing their principal business. The number of such wool-growers cannot be more than one per cent of the whole, and there can be no good reason for considering their interests; while, as will appear from Appendices C. and D., it is more than questionable whether even for them high tariffs on wool have been of any advantage. But, if we look at the interest of the whole farming population, we will see that it clearly indicates a lower tariff on wool.

PRICES OF WOOL.

We propose to show by the annexed table (Appendix C.), the average value of the standard classes of American fleece wool in the markets of Boston, New York, and Philadelphia, in each year from 1826 to 1874, and by another table (Appendix D.) the average prices of domestic fleece wool under the various tariffs.

It would be manifestly unsafe to base very definite conclusions on data of this kind, since the value of wool is determined by a great many causes that lie outside of our domestic production and of our tariff. At the same time the range of prices here given shows that wools commanded as high prices from 1858 to 1861 — when all costing under 20 cents were admitted free, and all costing over 20 cents paid only 24 per cent *ad valorem* — as they have brought in coin under the present tariff, when the duty is from 37 to 110 per cent on the first cost of foreign fine wool. While the present tariff can thus be shown to have produced no appreciable benefit to the wool-grower in general, it has manifestly failed to protect that special class which it was mainly intended to benefit, viz., the growers of fine merino wool. The wools that are least “protected” are the ones that command the best prices; combing qualities, produced by the sheep of the English breed (Class II.), bring on the current market 60 to 65 cents per pound, while merino is selling at 45 to 55 cents. The mutton of the coarse-wooled animal commands in market double the price of that of the fine-wooled sheep. To get large carcasses with long and strong wool, the fleece weighing nearly double that of merino wool, dealers in stock even now find it to their interest to import Cottswold and Bakewell sheep for breeding purposes; but we have no knowledge of any importation of fine-wooled sheep since the present tariff has been in force. Clothing-wool, Class I., was the

special object of protection, the rates of duty being, as above shown, from 39 to 110 per cent *ad valorem*, and in some cases as high as 120 per cent, an average of nearly thrice the amount of duties chargeable on the other classes. That this tariff has not only failed to produce the fondly predicted result, but has done positive injury to the growers of merino wool, will appear when we examine into the progress of domestic production. In the absence of any exact statistics with regard to our annual growth of wool, we are forced to rely on estimates that will necessarily vary more or less. We believe, however, that we are within bounds when we state, as an admitted fact, that from 1867 to 1872 the clip of fleece wool in the States east of the Mississippi has been continually declining, and is now reduced from about 140,000,000 lbs. in 1867 to a quantity estimated at not above 115,000,000 lbs. This statement is confirmed by the well-authenticated facts that the clips of Ohio and New York decreased between 1867 and 1874 from 28,000,000 lbs. and 15,000,000 lbs. respectively to 18,000,000 lbs. and 8,000,000 lbs. While the production of the less protected combing-wools (Class II.) has notoriously increased by a large percentage in the old wool-growing States, the clip of the highly protected clothing-wools of the merino variety can be safely asserted to have declined to hardly 70 per cent of the amount produced in 1866. If absolutely reliable statistics could be obtained, we have no doubt that a still greater decrease in production would be shown. Wool-growing has increased only in the far West, and even there its strides were quite as rapid under the low tariff of 1857 to 1861 as they have been at any period since.

FAILURE OF PROTECTION.

These facts show most conclusively that the object ostensibly aimed at by the tariff of 1867, viz., the protection and encouragement of the wool-growers, has most signally failed. The wool-grower must be blind, indeed, if by this time he has not learned the lesson that he cannot prosper as long as the woollen interest does not flourish; why should he not also understand that our industry cannot permanently flourish until it is relieved of the present heavy burden of obstructive tariff legislation? By helping the manufacturer he would certainly help himself, and secure a better reward for his labor and investment than he could ever expect to derive from the illusive protection of any tariff. Nor need the wool-grower fear that any reduction of duty on wool, or even the total abolition of all duties, could possibly diminish the value of his products by any thing like

what the present duty on fine wool amounts to. The immediate consequence of either of these changes would be an equalization of prices all over the world. Wherever any considerable American competition should appear, prices would advance; and our manufacturer would reap the benefit of such relief, not so much from the diminished cost of his raw material as from the freedom of choosing the best sources of supply for his various wants, and from the enhanced price which his foreign competitors would have to pay for their wool.

CONCLUSIONS.

Facts, indeed, as well as sound reasoning, call loudly for the abolition of all duties on wool. In the light of past experience it is clear that neither the wool-grower nor any other special interest ought to plead any injury as likely to result in our country from a policy that has had the most encouraging effect in all other parts of the civilized world. No perfectly safe and solid ground will be reached until wool takes its permanent place on the free list; and this must be the goal of the manufacturer as well as of the wool-grower, — in fact, of the whole people.

While desirous of urging these views upon all that take an interest in the question, and particularly on our law-makers, we, nevertheless, cannot overlook the fact that the great battle of free trade in raw materials is not likely to be fought out on the narrow ground with which we have here to deal. We consider the damaging effects of our wool tariff, however, so far beyond any thing that is inflicted on other raw materials and chief articles of commerce, and we regard the necessity of relief to our suffering industry as so pressing, that we feel ourselves compelled to counsel an approximation at least to sound and safe principles.

The arguments alleged against a total abolition of duties on wool are based on apprehensions, —

1. That the Government cannot as yet spare the revenue derived from the article;
2. That a sudden release of wool from the whole of the existing high rates of duty might, of itself, prove a change so violent as necessarily to occasion serious disturbance to the very interests we desire to see benefited; and
3. That a complete abolition of the duties on wool would justify the demand for lower duties on woollens, and thus raise questions that could not be decided in a short time.

Admitting, for the time being, the validity of these arguments, and despairing of securing at any early day what seems to us the wisest and best solution of the problem before us, we are compelled to seek some solution not chargeable with the above objections.

It will be remembered that our instructions from the Chamber of Commerce directed us to suggest such mode of relief as would not interfere with existing rates of duty. If we are to be limited to such proposals, we can make no other suggestion than that of changing from specific duties, and from specific and *ad valorem* combined, to purely *ad valorem* duties, adjusted according to the average rates resulting for each class from the calculation above referred to. (Appendix B.) The objectionable features connected with a division of the article into classes would in that case, however, necessarily remain untouched. If amended only to such limited extent, our wool tariff would essentially remain what it now is, — an ill-digested and incongruous law, and an impediment to the permanent prosperity of our manufacturing interest as well as to that of the wool-growers. The benefit to be expected from such a modification of our tariff would be so insignificant that we cannot with any degree of earnestness recommend it. We believe, however, that we comply with the spirit of our instructions, if we report, as the result of our investigations, —

1. That any effectual amendment of our wool tariff must include a considerable reduction of the present duties on fine wool.

2. That such amendment must consist in the establishment of one uniform *ad valorem* duty on all wool, so as to do away with classifications.

3. That an *ad valorem* duty of 25 per cent would, in our opinion, be a just rate, — a rate that would give certain relief to our suffering interests, and would, at the same time, yield sufficient revenue to the Government.

All which is respectfully submitted.

NEW YORK, Nov. 27, 1874.

JAMES LYNCH,	}	Committee.
L. J. STIASTNY,		
P. O. STRANG,		
D. A. RIPLEY,		
G. SCHWAB,		
JOHN T. WARING,		
ABRAM MILLS,		

PROCEEDINGS OF THE GOVERNMENT OF THE NATIONAL ASSOCIATION OF WOOL MANUFACTURERS.

A MEETING of the Government of the National Association of Wool Manufacturers was held, in pursuance of previous notice, at the St. Nicholas Hotel, in the city of New York, on the 4th of February, 1875, the President, Mr. J. WILEY EDMANDS, being in the chair.

The subject of participation in the coming Centennial Exposition at Philadelphia having been brought to the notice of the Government by the President, several members expressed their great interest in the exposition, and the desirableness of having the products of our wool manufacture suitably exhibited. Upon a motion being made that the President should nominate a committee to consider and act upon this subject, and report to the Government the action which it is expedient for the Association to take in this matter, the chair appointed Messrs. E. R. Mudge, J. W. Stitt, L. P. Porter, and John L. Hayes, who were duly elected as the committee.

The President then called the attention of the meeting to the propriety of taking some action in relation to the construction prevailing in the Treasury Department in opposition to a recent judicial decision, by which the *ad valorem* as well as the specific duties were doubled and trebled on washed and scoured wool. After some remarks from Mr. G. W. BOND explaining the operation of the present construction, he submitted the following resolution, which was unanimously adopted:—

“Whereas, the Circuit Court of the Eastern District of New York decided, in the case of *De Forest v. Arthur*, Jan. 22, 1874, that, in estimating the duty upon wools of the first class imported washed, the specific duty, or the duty by amount only, was to be doubled, we, the Government of the National Association of Wool Manufacturers, hereby instruct our Secretary to urge the Secretary of the Treasury to accept that construction of the law, and to direct the several collectors hereafter to liquidate all entries in accordance therewith, because that construction is in accordance with the construction of the framers of the law.”

The Secretary submitted a note from the chairman of the Committee of Ways and Means, inquiring as to the views of wool manufacturers in relation to the restoration of the ten per cent duty upon manufactures, wool, &c.

This note gave rise to a very animated discussion, involving the effect of the present wool and woollen tariff, and the operation of the proposed change upon wool manufacturers from the increased duty on wool. The discussion, not being intended for the public, is not reproduced. Upon motion of Mr. PORTER, a committee, consisting of Messrs. Porter, Robinson, and Hayes, was appointed by the chair to draft a resolution to be proposed to the Government. The committee having reported, the meeting passed, by a considerable majority, the following : —

“Resolved, That the Secretary of the Association be requested to communicate to Mr. Dawes that the Government of the Association does not interpose any objection, on the score of their own interests, to a restoration of the ten per cent duty, if the financial interests of the country require it.”

On motion of Mr. POMEROY, it was

“Resolved, That the Secretary be instructed to use his influence with the proper committees in Congress to provide that the restored duty proposed should not apply to goods on shipboard; and also to take such action as may correct the abuses in the importation of goods made of cow hair.”

Mr. GEORGE WILLIAM BOND read the following paper : —

To the Government of the National Association of Wool Manufacturers.

GENTLEMEN, — A careful study of the races of sheep, to which I have been led in preparation of the standard samples of wool for the United States Government, seems to indicate that the numerous varieties of sheep now scattered over the face of the globe owe their peculiarities to various influences, some of which are apparent, but others of so abnormal a character as not to be easily traced, still most of them such as a careful and patient study of the whole subject may help greatly to elucidate. Such study, faithfully pursued, cannot fail to be of vast benefit to the world, especially to a country like our own, extending over so great a territory, and embracing every variety

of climate and soil. As all the races appear to have originated from animals producing wool which we now consider as of the coarsest and least valuable character, it becomes interesting and important. The natural covering of all sheep is hair and wool. This is shown in the merino sheep in its early days, every lamb being born with this double covering, but losing its hair before it reaches maturity, while the wool of the choicest specimens of the race is not finer than that of some other races regarded as of the meanest character, because in them it is accompanied with hair so coarse as to make their fleeces unfit for almost any use.

This subject has not received that degree of scientific attention which to me it seems to deserve, and which it is very difficult to awaken.

I found in Europe even scientific men — zoötechnists of the highest position — interesting themselves almost solely with the races that had reached the highest perfection, and overlooking the steps by which such perfection has been attained.

It has long been my earnest desire that cabinets of the wools of all races should form a part of the apparatus of our scientific and agricultural colleges, and I hoped ere now to have been able to make a commencement in that direction; but the great fire of 1872 destroyed all the material that I had gathered. I was almost ready to abandon the attempt, but Professor Agassiz wrote a letter urging me to continue, in which he said: —

“I was very glad to hear from you, and can only hope you may go on with your investigations upon wool and the races of sheep. I know no department of applied zoölogy which promises more valuable scientific results, and at the same time more important practical information for our farmers. I find it very hard to create an interest among our legislators for scientific research. I hardly find half a dozen men who understand that before knowledge can be applied to useful purposes, the *knowledge* must be secured by scientific men, through very laborious and difficult investigations. Everybody clamors for practical work, without a proper understanding of the relation between science and practice.”

How, then, can this be done? One measure occurs to me which will give a great impetus to the undertaking; viz., to have prepared for the Centennial Exposition a collection, as far as possible, of all the wools of the world, so arranged as to show the changes and the capabilities of each race. My present idea is, that I would adopt the

classification of Dr. Fitzinger, of the Imperial Academy of Arts and Sciences of Vienna, and exhibit each of the ten races which he describes, placing at the top of an exhibition case small typical specimens of wool of one of the races, next below the sub-races, and below these of the crosses, and would have ten such cases, so that at a glance one can form some estimate of the capabilities of each race.

Such an exhibit has never been made, and I am aware cannot be without much labor and expense; but the same labor and expense will be nearly all that will be required to provide material for the cabinets to which I have before alluded. It is very desirable that the plan, if it meets the approval of this Association, should have its cordial indorsement. It is further desirable that it should have the co-operation of the United States Government, and that its diplomatic and consular agents should be asked to further it by any means within their reach or control.

If through such agents this plan should be laid before the governments which have engaged to be represented at the Exposition, each of them could aid by obtaining typical fleeces of such races as exist within their borders.

This would meet the case, if the duty of selection should be given to men understanding it.

Respectfully submitted by

GEORGE WILLIAM BOND.

After the reading of this paper, the President, Mr. Maxwell, and Mr. Pomeroy, expressed their hearty approval of the proposition therein made; and, upon motion of Mr. POMEROY, it was

“Resolved, That the Secretary be instructed to express to the proper authorities in Washington the hearty approval which the plan suggested by Mr. Bond receives from the Government of this Association.”

The meeting thereupon adjourned.

TREASURY¹ DECISION AS TO DUTY ON WASHED AND SCOURED WOOL.

The following correspondence and official action are the results of one of the resolutions passed by the Government at their meeting as above recorded : —

TREASURY DEPARTMENT,
WASHINGTON, D. C., February 18, 1875.

SIR, — Your communication of the 12th instant is received, in which you state that the National Association of Wool Manufacturers instructs you to communicate the resolutions adopted by that Association at a meeting held on the 4th instant at New York, asking the acquiescence of this Department in a decision of the Circuit Court for the Eastern District of New York, in the case of *De Forest* against *Arthur*, Jan. 22, 1874, defining the meaning of the words in the statute imposing duty on wools of the first class, washed.

In reply, you are informed that the Department proposes to acquiesce in the said decision, and to take the construction of the law so declared by the Court, and to inform customs officers accordingly.

Very respectfully,

B. H. BRISTOW, *Secretary*.

J. L. HAYES, Esq., Boston, Mass.

NATIONAL ASSOCIATION OF WOOL MANUFACTURERS,
Office, 11 Pemberton Square,

BOSTON, February 12, 1875.

Hon. B. H. BRISTOW, *Secretary of the Treasury*.

SIR, — The undersigned Secretary of the National Association of Wool Manufacturers is instructed to communicate to you a resolution passed unanimously by the Government of that Association, at a meeting held at St. Nicholas Hotel, in the city of New York, on the 4th February inst. The resolution is as follows : —

“ Whereas, the Circuit Court of the Eastern District of New York decided, in the case of *De Forest v. Arthur*, Jan. 22, 1874, that in estimating the duty upon wools of the first class imported washed, the specific duty, or the duty by *amount* only, was to be doubled, we, the Government of the National Association of Wool Manufacturers, hereby instruct our Secretary to urge the Secretary of the Treasury

to accept that construction of the law, and to direct the several collectors hereafter to liquidate all entries in accordance therewith, because that construction is in accordance with the instruction of the framers of the law."

Permit me to add some considerations in support of the position taken in the above resolution.

The sections of the law under which the duty is imposed upon the wools in question are as follows:—

"Upon wools of the first class the value whereof, at the last port or place whence exported to the United States, excluding charges in such port, shall be thirty-two cents or less per pound, the duty shall be ten cents per pound, and in addition thereto eleven per centum *ad valorem*; upon wools of the same class, the value whereof, at the last port or place whence exported to the United States, excluding charges in such port, shall exceed thirty-two cents per pound, the duty shall be twelve cents per pound, and in addition thereto ten per centum *ad valorem*, . . . provided that the duty upon wool of the class which shall be imported washed shall be *twice the amount of duty* to which it would be subjected if imported unwashed; and that the duty upon wool of all classes which shall be imported scoured shall be three times the *amount of the duty* to which it would be subjected if imported unwashed."

The first question which arises is as to the object of the law in making the distinctions of duty in these conditions of unwashed, washed, and scoured wools.

Admitting the legal principle that the intent is generally and properly sought from the body of the act itself, when the words of the statute make construction doubtful, the intention may be taken from the context, from the occasion and necessity of the laws, from the mischief felt, and the objects and remedy in view. The circumstances leading to the enactment of the tariff law of 1867 are so peculiar that the occasion and objects of laws must be sought for, in some measure at least, outside of the statute itself.

The Secretary of the Treasury is doubtless aware that the tariff of 1867, in which the provision as to the duty on washed wools first appears, was adopted by Congress on the recommendations of a joint convention of wool-growers and wool manufacturers made to the Revenue Commission, and by that Commission submitted to Congress. The intent of the actual framers of the law — the National

legislation — may be inferred from the intent of the joint convention, whose recommendations were strictly followed by Congress in the law of 1867. The undersigned having had the honor to be secretary of the joint convention of wool-growers and wool manufacturers referred to, and having been present at all their delegations, can speak with certainty of the intent of that convention in the ~~prom~~ *provision* of a tariff recommended by them.

Their first object was to carefully adjust the duties on wool, and on manufacturers of wool, to each other; the intent having been to make the specific duty on manufactures reimburse the duty on the wool. This required that the duty on the wool should be uniform, whatever its condition. The three conditions are those of scoured, washed, and unwashed wool. The scoured wool is pure wool fibre as put on the cards; the washed and unwashed are wools containing more or less impurities.

The interest of the wool-growers, in their opinion, required that the standard of duty should be fixed by that placed on unwashed wools. The relative duty required on washed and scoured wools was to be determined by the average yield of unwashed wools in washed or scoured wools. This could only be determined by approximation. It was found that Cape wools yielded from 32 to 40 per cent of scoured wool; River Plate wools vary from 25 to 35; Australian, from 30 to 50 per cent. By a careful analysis it was estimated that $33\frac{1}{2}$ per cent was as near the average rendition in scoured wool as any rate which could be practically adopted. The average rendition of washed wools, in pure or scoured, was estimated at $66\frac{2}{3}$ per cent. The duty was made uniform on these different conditions by doubling the *specific* duty on the unwashed wools for the washed wools, and trebling that specific duty for scoured wools. The value of wools of the same grade is determined by their yield in scoured wool. The *ad valorem* duty therefore takes care of itself, it being increased exactly according to their condition, which determines their value.

To double and treble *both* the specific and *ad valorem* duties inevitably, and in all cases, subjects imported washed and scoured wools to more than twice and three times the amount of duty to which they would be subjected if imported unwashed, and in many cases of scoured wools to four times the duty. This clearly was not the intent of the law, because the proviso distinctly says that the duty on washed wools shall be twice *the amount* of duty to which it would be subjected if imported unwashed, and the duty on scoured wools shall be

three times the *amount of the duty, &c.* If a construction is given to the law which compels the importer to pay more than twice or three times the *amount* of the duty on unwashed wools, the intent of the law, as shown in the precise use of the word "amount," and in the reasons for doubling and trebling the duty before given, is defeated.

The construction which doubles and trebles both the *ad valorem* and specific duty on washed and scoured wools, and subjects the manufacturer to more than three times the amount of duty on unwashed wools, defeats a leading object of the tariff of 1867, which was to make the specific duty on the cloth reimburse the whole duty paid by the manufacturer on the wool. The reports of the joint convention of wool-growers and wool manufacturers, the reports of the Revenue Commission, and the discussions in Congress, show that the object sought for in the tariff of 1867 was to give sufficient protection to the wool-grower, and at the same time to place the manufacturer in the same position as if he had his wool free of duty. If the manufacturer is compelled to pay on scoured wool more than three times the amount of the duty on unwashed wool, he pays an excess of duty for which he has no compensation in the specific duty on cloth, — a condition of things which the whole tenor of the tariff of 1867 forbids.

But the language of the law and its manifest intent can be reconciled, upon the well-known principle of determining the intent of the law from its whole purport, by considering the words, "amount of duty," as applying only to the specific duty.

The provision as to washed and scoured wools is not an independent section, but a proviso to the general section imposing the duty on all wools. The general law imposing specific duties on all wools, and in *addition* thereto eleven per centum *ad valorem*, remains in force as to washed and scoured wools, so far as the *ad valorem* clause is concerned, notwithstanding the proviso. Let us hold that the term, "amount of duty," does not mean the amount of both specific and *ad valorem* duty, but that it means that the importer should pay no more and no less duty than twice or thrice the "amount" — *i.e., sum* — he would pay on unwashed wool, and we have a construction consistent with the clear intent of the law and with public policy.

There can be no reason conceived for prohibiting the importation of washed and scoured wools. This would be injurious to the manufacturer and the consumers of cloth, and of no benefit to the wool-grower, protected by all the duty he claims.

But the construction of doubling and trebling the *ad valorem* duty, which has hitherto prevailed in the Treasury Department, has the effect of virtually prohibiting the importation of washed and scoured wool,—a purpose which certainly was never contemplated by the framers of the law, and was as far as possible from the intent of the convention of wool-growers and wool manufacturers in recommending the law.

On the other hand, if the decision in the case of *De Forest v. Arthur* is confirmed, it will open to American buyers the markets of washed and scoured wools, and no longer oblige them to confine themselves in purchasing to wools unwashed, of the lightest shrinkage, which are frequently forced by the American competition above their relative value to wools in other conditions, but will enable them to substitute those in a washed and scoured condition.

The latter point is one which should receive weighty consideration from the Secretary of the Treasury, as by the opening of these wools to importation the revenue would be materially increased.

Another reason for the construction asked for is, that it will entail no reclamations for return duties. It is believed that no importations of washed and scoured wools have been made except by accident, and the duties in such cases have not been paid under protest. The most important practical objection to this construction is thus removed.

The undersigned, therefore, in behalf of the National Association of Wool Manufacturers, comprising the most important wool-manufacturing establishments in the United States, most urgently solicits the Secretary of the Treasury to accept the construction of the court in the case referred to, and to direct the liquidation of entries in accordance thereto, assuring the Secretary that he will thus confer a boon upon the wool manufacturers which will be most gratefully accepted in the present depressed condition of their industry.

I have the honor to be, respectfully, your obedient servant,

JOHN L. HAYES,

Secretary of National Association of Wool Manufacturers.

THE COTTON INDUSTRY OF THE WORLD.

NONE of the industrial societies of Europe occupy a more commanding position than the *Société Industrielle* of Mulhouse. Its "Bulletin" is authority upon all the textile matters of which it treats. Upon the cotton industry it speaks with peculiar weight, since Mulhouse is the centre of a cotton manufacture unrivalled in the excellence of its products, and which before the occupation of Alsace by Prussia, in the late war, was one of the proudest boasts of France. For this reason we have translated from the "Bulletin" of the above-named Society for November, 1874, the following "Notes upon the Cotton Industry at the Universal Exposition at Vienna, by Charles Grad." It will be instructive to American cotton manufacturers, who sometimes consider themselves quite independent of protection, to observe how the author of this article, although only referring to the subject incidentally, attributes our second place among the cotton manufacturers of the world to our protective duties; how he shows the disposition among other nations to secure their advance in the cotton manufacture by the same system; and how he shows that the old nations, which had formerly unlimited outlets for their surpluses, are finding themselves every day becoming limited by the growing tendency among nations to supply themselves with their own productions.

NOTES UPON THE COTTON INDUSTRY OF THE WORLD.

That which struck us above all in the cotton industry at the Vienna Exposition was the increasing development of this industry in the countries where it was wanting but a few years ago, especially in the countries producing cotton; such as English India and the United States. Thus, without speaking of the United States, which formerly afforded our products a great outlet, now interdicted by prohibitive duties, Russia, Italy, and Spain have founded, and continue to erect, very considerable establishments for the manufacture of cotton. These countries formerly obtained all their cottonades from France and England: they seek now to supply themselves in every possible measure; and we observe, in the exposition of their

goods, the realization of a great progress. During late years the general consumption has increased with the production. But the progress of industry in the countries formerly almost exclusively supplied by our products tends more and more to limit our old outlets, and renders the disposal of surpluses more difficult.

The sale and production of raw cotton, stimulated by these numerous demands, gives the first idea of the ascending march and progress of fabrication. After a period of arrest, and a marked diminution during the crises provoked by the American war, the consumption of cotton from all sources has increased anew in a notable proportion. Thus the consumption of Europe, which had fallen to 349,000,000 kilogrammes in 1862-63, and to 342,000,000 kilogrammes in 1863-64, according to a remarkable report of M. Engel-Dollfus to the jury of the Universal Exposition of 1867,—this consumption has attained 694,000,000 kilogrammes during the year of the Exposition. Under the influence of prices raised quite fourfold, and even more, the cotton culture has been spread in all the warm countries to such a point as to cause attempts in the middle of France. If the return to a normal state of things, and the lowering of the price anew, has caused the abandonment of this culture at certain points for more remunerative products, the production of different countries has, nevertheless, undergone considerable changes. The production in the United States for the two years 1866 and 1867 has attained only half as much as in 1861 and 1862, while reaching 550,000,000 to 580,000,000 kilogrammes in 1872. On the contrary, India furnishes now nearly 250,000,000 kilogrammes in place of from 180,000,000 to 200,000,000 in 1861; Brazil, 50,000,000 in place of 10,000,000; Egypt, 105,000,000 in place of 100,000,000. According to the best valuations, we may estimate the annual production of cotton in the whole world at about 1,000,000,000 kilogrammes, of which a little more than half is cultivated in the United States; this, after taking into account the more or less favorable fluctuations in the production from one year to the other.

According to the statistics collected on the occasion of the Exposition at Vienna, the cotton industry employs 62,700,000 spindles against 58,850,000 counted in 1867. It has attained its greatest development in England, which has now an effective force of 35,000,000 spindles for simple threads, with 400,000 looms for weaving, and a total of about 650,000 workmen. Next after England comes the United States, with an effective force of 8,000,000 spindles; then France, with

5,700,000; Germany, with 4,700,000, of which Alsace has 1,700,000; Russia, 2,000,000; Spain, 1,400,000; Belgium, 600,000; Italy, 500,000; and about 2,000,000 for all other countries, of which there are several hundred thousand in English India. Valuing the average cost of an establishment at fifty francs per spindle, we find a capital surpassing three thousand millions of francs invested in the spinning of cotton in the entire world, — an enormous sum, but less than the war contribution paid by France to Germany. The value of raw cotton consumed per year may be valued at fifteen hundred and a half millions. The sum of annual wages paid rises to from seven hundred to eight hundred millions of francs, for a total of about 1,200,000 operatives.

Thus the cotton industry has had of late years a perceptible development. But we do not find any considerable improvement in machinery or the processes of manufacture. The principal progress in spinning consists in the almost complete transformation of the old hand machines to the automatic mules, and, in weaving, the increasing substitution of power-looms for the old hand-looms. The difficulties of the automatic fabrication of fine yarns were conquered a long time since; but a part of these yarns are still made by the old jenny, in spite of the cost of the manipulation.) A Swiss house, from Zurich, exhibited at Vienna yarns as fine as No. 500 English measurement; that is to say, which measured 850 kilometres to the kilogramme. Nevertheless we remember to have seen at the Paris Exposition in 1867 a specimen from Tarare of the fineness of No. 700 French measurement; that is, so fine that a thread stretched from Paris to Algeria, — a distance of 1,330 kilometres would weigh less than a kilogramme. Moreover, France had already produced yarns of No. 600, of remarkable strength, at the first International Exhibition in 1851. But these are exceptional *tours de force*, executed to show the skill of the workman and the excellence of material, and not to put the articles commercially in the market. Articles like these cost too high, and do not find consumers at the price of production. The numbers of the yarns used for the beautiful mousselines of Tarare, or in the fabrication of the tulles of Nottingham, are not nearly so high. Even the finest tissues of the Swiss section at the Exposition of Vienna did not surpass No. 210 for the web and No. 200 for the warp. Most countries produce yarns of much less fineness. No Austrian establishment exhibited a yarn above No. 80. Austria, as the United States did formerly, and Germany does still,

draws her fine yarns from England, Alsace, and Switzerland. There is required for fine spinning a very high degree of skill, with a more complete machinery for a less production in quantity; for while a spindle spinning a chain of No. 28 can produce from 17 to 18 kilogrammes per year of 300 days' work, a spindle spinning a chain of No. 150 produces hardly a kilogramme.

The finest and most beautiful simple threads or yarns come, then, from France, England, Alsace, and Switzerland. For sewing threads and twisted threads, formed by doubling and twisting the most simple threads, England has, above all others, the superiority; and in that country this industry has taken, and continues to take, more and more development. More than twenty English houses exhibited at Vienna threads for sewing-machines. Their products surpassed those of other countries, — less, however, in the strength of the thread than in the beauty of the finish and lustre of the colors. They have succeeded in obtaining threads of cotton *glacé*, or sized, quite perfect enough to replace silk for many uses. The most beautiful machine threads came from establishments of Messrs. Brooks (Meltham, Ashworth, Bolton) and Clark (Paisley). An observable fact in regard to these great English factories is, that the greater part of them make only a very limited number of articles, to great advantage in return of profit and perfection of products. There is a much greater variety of articles in the exhibits of the French and German sections. Thus the houses of Herzog (of Logdbach), Schlumberg (of Guebweiler), Cartier-Bresson (of Paris), and Boeddinghaus (of Eberfeld), exhibited sewing threads in skeins and upon bobbins of all hues, with a numerous collection of sized threads, crochet yarns, cords, &c. Dresden and Augsburg, in Germany, possess some establishments for sewing threads; but they are not sufficient to supply the consumption of the interior, which is supplemented by England. England, above all, supplies Germany with sized sewing threads for machines whose use has become general in consequence of the substitution of sewing-machines for sewing by hand. As regards Austria, she remains tributary to other countries for twisted yarns, as well as for simple yarns of a superior quality. A single Austrian house exhibits sewing threads dyed with all the tints; but the quality is mediocre, and the colors dull.

The spinning of cotton now constitutes the most advanced of the textile industries, as well in the perfection of the work as the beauty of its products. Our yarns at Alsace are equal in real value to the

best of other countries ; but we can still improve our sewing-machine threads ; in relation to which we can learn much from England, as to the brilliancy of the finish, the regularity of the fabrication, and all the qualities susceptible of enhancing the exterior appearance of the merchandise. In fact, the cotton tissues, the woven cottons of Germany and Austria, present products comparable with the finest of Alsace and France. We observed some Austrian tulles and flowered stuffs of great fineness exhibited by the Austrian factories, with a series of articles, such as piqués, radiated, damasked, and fashioned in every manner. Tarare presented some radiated gauzes of all colors, and of perfect elegance. France, Switzerland, and Austria exhibit embroidered tissues of great richness, among which the French products hold, without contradiction, the first place in respect to taste.

It is the taste of the designs and their great variety which distinguish also the printed cloths of Alsace, among similar articles, from other countries. Unfortunately this beautiful industry was not represented at Vienna as at the Universal Expositions of Paris and London. Whether the printed stuffs of Mulhouse — everywhere known and highly appreciated — had no need of adding to their reputation, or that the grand industry of Alsace, preserving its sympathies in spite of our unhappy political situation, had a repugnance to appear under the eyes of a foreign flag, the factories of calicoes and printed cloths of our region refused to take part in the Exposition. [After giving a list of the few houses whose products were accidentally exhibited, and enumerating some of the famous houses of Alsace which did not exhibit, M. Grad proceeds.] In spite of this abstraction, the specimens, much too rare, of the printed stuffs of Alsace which figured at the Exposition attested a manifest superiority in the sentiment of taste, elegance, and originality of design, harmony of colors, and fecundity of combinations, — always new, and adapted to all fancies. England and Germany can produce cheap articles of medium quality ; but Alsace is without rival among competitors in stuffs of luxury.

Germany is making great efforts to improve her manufacture of printed stuffs ; and the imperial commission of Berlin did not regard with pleasure the absence of the Alsatian print cloth manufacturers. In the German Exposition, Berlin, Orefield, and Eberfield, in the Austrian section the factories of Munkerchen, of Reichenberg, and of Oosmanos in Bohemia, showed some fine specimens of dyed and

printed tissues. Nevertheless, these products could not rival the articles of luxury printed at Alsace, neither in taste of design nor in colors. The international jury was quite emphatic upon this point. All the world knows, besides, that the greater part of the inventions relative to the application of colors for the printing of tissues are of Alsatian origin; we know also how this industry lends to Paris inspirations for new styles. In the choice of designs, Germany, and, above all, Prussia, has much difficulty in placing themselves on the level of ordinary excellence, even in the judgment of the Germans themselves, with whom modesty is not a ruling quality. According to the testimony of M. Muller of Stalle, which M. Engel-Dolfuss cites in his reports on the School of Design of Mulhouse: "There is in the German artistic industries neither taste, originality, nor character. It is much surpassed by the French and even by the English industry. Such a revelation is a cause for reflection. With this habit of following the designs of foreign nations, and of remaining a slave to their models, there is much to disturb a friend of one's country. To be poor in specimens, and original and tasteful models, this is what is called in our times an incapacity to create a market." To these just reflections we may add the judgment of M. Wolfgang Menzel, a humorist, which is given thus: "Where do we not see among us the deification of every thing that is foreign, the aping of foreign fashions? We are so accustomed to it, that, if some day the German nation should take a fancy to look at herself in a mirror, she would see, not a German being, but a French monkey."

At the present time, England, the United States, France, Switzerland, and the German Zollverein (of which Alsace now forms a part) have a greater production in articles of cotton manufacture than the home consumption of these articles, and these countries are therefore obliged to look abroad for markets for their surpluses. England, the United States of America (!), with a powerful navy, and commercial relations with all parts of the world, have no difficulty in selling their products. But for France and Switzerland, the placing of their surpluses is a matter of extreme difficulty. But for the home consumption in Germany, the added competition effected by the annexation of Alsace, which has nearly doubled the production, without any compensation in outlets for goods, has placed the cotton industry in a very critical position, and has caused a crisis, the severity of which is attested by the ruins which it has produced. Even before the annexation of Alsace, the production of cotton woven goods in Ger-

many was greater than the home consumption. In fact, during the period of 1868 to 1870, the custom returns show an annual excess of 9,492,700 kilogrammes of exportations above the importations, while in thirty years the average products consumed per head by the home population has doubled. Therefore the German manufacturers are greatly interested in the question of the suppression of the duties still existing against the importation of English products, which is demanded by the ports of the North Sea in reciprocity for the free entry of cottons of German origin into England. To weaken the effect of the free admission demanded for English products, it is alleged that the German Government has made negotiations to lower, by means of commercial treaties, the duties imposed on the introduction of German goods into Russia and Austria. But all these treaties are merely in the shape of propositions.

A document published by the imperial German Commission at the Vienna Exposition shows the severe effects of English competition in the German markets, especially during the first half of the present century. The first developments of spinning by power in Germany as well as Austria date from the epoch of the continental blockade. The customs union, the Zollverein, first concluded between Bavaria and Wurtemberg, and into which Prussia and the other Northern States of Germany entered with the view of opening a way to the unity of a new empire, had a very favorable effect upon the development of this industry. According to official returns, the countries of the Zollverein, which consumed in 1836 about 9,288,500 kilogrammes of raw cotton, worked up in 1869 70,120,000; and while from 1836 to 1844 they imported 70 per cent of their yarns, the importations of yarns had fallen to 20 per cent for 1847 to 1869. Notwithstanding the annexation of Alsace, Germany still imported in 1871 a quantity of 20,277,600 kilogrammes of English or Swiss yarns, against an exportation of 2,565,600 kilogrammes made to Austria. The number of spindles in activity in all the countries of the Zollverein in 1830 was 626,600, and of this Saxony alone had 341,000. Germany now, with an effective force of 4,700,000 spindles, including Alsace, possesses from six to seven per cent of the spindles in activity in the whole world, against a proportion of two to three per cent in 1830. The most rapid progress was during the period of 1846 to 1860, for the average number of spindles was increased 2,890 to 7,020 during this interval. Almost all the large establishments belong to associations, and some of them, like that of Stadtbach at Augsburg, employ 100,000 spindles.

The principal centres of the cotton industry of the empire of Austria are found in Bohemia, in the German provinces of High and Low Austria, and in the Tyrol, around Innsbruck and Bludenz. In Prussia, Westphalia, the province of Rhine and Silesia, which have the largest establishments; in Saxony, the districts of Zwickau and Chemnitz; in Bavaria, Suabia, the Palatinate and Upper Franconia; in Wurtemberg, and in the countries of Baden, the valleys of the Black Forest.

Since the close of the seventeenth century, cotton weaving has penetrated the districts of Germany where linen weaving had been established, as Silesia, Suabia, and the countries of Berg. Later the English competition arrested the development which the continental blockade had promised for the home market of Germany. When the blockade ceased, the English competition returned with all its force. It became necessary to compensate the natural advantages of the English manufacturers by protective duties; and, thanks to those duties, the spinning of cotton commenced to develop itself in its turn, while weaving by power began to take the place of the hand-loom. Then the progress in dyeing and printing still increased the protection (all dyed and printed woven goods being protected), and the construction of machinery at home commenced.

[After mentioning the principal centres for weaving cotton in Germany, the author continues:—]

According to the statistics of the Zollverein, there were in 1861—the only year for which the dates are given complete—23,491 power-looms and 164,459 hand-looms for weaving tissues of cotton or mixtures of cotton; 4,234 power-looms and 81,384 hand-looms for sheets and hosiery. Perhaps, however, the number of 164,449 looms for weaving cotton, as well as that of 2,000,000 spindles, instead of 1,700,000, also given for Alsace by official returns is too high. It is evident that in all cases hand weaving must give place to power weaving, in spite of the smaller wages paid to workmen, while the competition of Alsatian industry will hasten this transformation.

I have spoken of the lowering of the entry duties demanded by Germany for the importation of its products into Austria and Russia. These duties are prohibitive on the part of Russia in respect to common articles, and they are very considerable on the part of Austria. In order to introduce the Zollverein yarns into Austria, we must pay a duty of 20 francs per 100 kilogrammes for simple cotton yarns, which gives some facility to the commerce in fine yarns. On the

contrary, the Austrian *woven* goods are protected by much higher duties. For instance, 80 francs per 100 kilogrammes for ordinary calicoes; 100 francs for velvets and heavy tissues; 150 francs for lighter and finer tissues; 300 francs for tulles. For finished bleached or colored articles the import duties are still higher. Under this *régime* foreign tissues have great difficulty in penetrating Austria; and the Austrian spinners maintain that their own industry would have attained a much greater importance and development than it now has if it had been protected by the same duties as have been extended to woven goods. However, the want of large capital explains still better the backward condition of Austrian spinning; for there has been no attempt to procure capital by the principle of association.

To resume, the Universal Exposition of Vienna indicates the recent progress in the cotton manufacture, — a progress which consists less in new inventions and great improvements than in the generalization of mechanical ameliorations already introduced, and even a long time since, by the most advanced nations; and, secondly, in the development of production in the countries where the cotton manufacture formerly was of little importance. It appears that everywhere the power spinning machines have completely taken the place of the old hand machines; while weaving by power reduces more and more the weaving by hand-loom. But the significant fact placed in evidence by the Exposition is, above all, the rapid development of the cotton manufacture among the peoples who, a few years ago, obtained all their cotton fabrics from our own factories.

THE SILK INDUSTRY OF THE UNITED STATES FROM 1766 TO 1874.

BY A. T. LILLY.

As the following sketch is largely composed of personal reminiscences, no reference will be made to early efforts at silk culture and manufacture in Georgia, and elsewhere at the South, during colonial times, which have been already recorded in history. No attempt will be made to describe the praiseworthy labors at Philadelphia of Mr. Hoeckly in 1793, and Mr. William H. Horstmann in 1815. The present retrospect will be confined to the origin and growth of the silk industry in a locality with which the writer was thoroughly acquainted. A peculiar interest gathers around the early struggles of a manufacturing art which has since been established at numerous sites far from its obscure birthplace, and has now become of national importance.

An extract from Barber's "History of Connecticut" (published in 1836) may fitly serve to introduce further details. Under the head of "Mansfield" is the following:—

A larger quantity of silk is manufactured here than at any other place in the United States. This branch of industry was introduced into this country by Dr. Aspinwall, of this place, about 1766, who established the raising of silk-worms in New Haven, Long Island, and Philadelphia. At this period (1766) half an ounce of mulberry seed was sent to every parish in Connecticut, and the legislature for a time offered a bounty on mulberry-trees and raw silk. Two hundred and sixty-five lbs. were raised in 1798, and the quantity has been increasing ever since. In 1830, 8,200 lbs. were raised. Two small silk factories have been established in this town by an English manufacturer. The double wheel-head was invented by Mr. Horace Hanks, about the year 1800, for the purpose of spinning silk. It was first used in the family of Mr. Wright. The first silk reeled from cocoons was the work of the wife of the Rev. Mr. Martin, who had been in France, and had seen the operation in that country.

The growth of silk culture in Mansfield, as indicated above, steadily rising from 265 lbs. in 1793 to 3,200 lbs. in a period of thirty-seven years, was continuous until 1843-44, when a blight of the mulberry-trees and other concurrent misfortunes led to an abandonment of the business of raising silk, not only in that locality, but throughout the country. The growth of the trees probably dates from 1766, when

there was a general distribution of mulberry seed throughout the State of Connecticut. Mansfield seems, however, to have been the only locality where raising silk became a fixed industry. This must be attributed rather to the interest taken in the matter by the inhabitants of the town than to any peculiar advantage of soil or climate. Until the blight of 1844 killed the mulberry-trees, they were growing throughout the township. Here and there portions of land, quaintly termed "mulberry orchards," were entirely devoted to them, and they stood in rows, being planted fifteen or twenty feet apart. Elsewhere, and not unfrequently, they shaded the sides of the roads leading to the farm-houses, they adorned highways and by-ways, and fringed the edges of the cultivated fields. The mulberry-tree interfered little, if at all, with the use of the land for other purposes, while it furnished the means of a considerable income to its owner. The silk obtained by a single family sometimes amounted to 130 lbs. in a season. The labor required was light, as the processes were simple and invariably successful, and women and children performed all the work, except during the sixth or last week of the life of the worms, when the men usually gave assistance. Sometimes the owner of trees let them on shares for the season; sometimes he sold their leaves at a given price per pound, to be picked by the purchaser. This constant source of income to the owner of mulberry-trees was for fifty years a demonstrated fact. There is no reason why it should not again be possible, and not in a restricted locality, but throughout the breadth of our country. The deficiency is not of climate or soil, but of willing hands. Not only the care of the silk-worms, but the manufacture of silk, and in most cases its sale, were part of the business of the matron of the house. The silk was reeled from the cocoons by a process of the most primitive description; and so crude was the product thus obtained that it could only be spun by hand. It may well be doubted whether silk so reeled could be used by a manufacturer, if aided by all the ingenious machinery of the present day. The hand-wheel, on which previous to the year 1800 all spinning was performed, was exceedingly simple. A band carried the motion directly from a large wheel turned by the operator to the "whur" on the spindle; and many revolutions of the wheel were required to give the needful twist. In the year 1800 Horace Hanks invented the double wheel-head. In this device the band passed from the large wheel to a counter-shaft, and thence to the spindle "whur," giving an increased speed of 145 turns to one as compared with the old wheel-head. The new invention, under Hanks's

patent, was hailed by the matrons of that day with enthusiasm as a labor-saving contrivance, and found due appreciation in spinning silk, wool, and cotton.

American sewing-silk was at that time sold by the skein instead of by weight. For convenience, twenty-five skeins were tied in a bunch, and four bunches were fastened together, thus giving a merchantable package of one hundred skeins,—a unit of trade on which the price was based. Uniformity in length of thread was secured by act of the legislature, which declared that there should be forty yards in a skein. The act was enforced with the following penalty:—

Any person or persons who shall sell or offer for sale any sewing-silk, unless each skein consists of twenty threads, each thread of the length of two yards, shall forfeit the sum of seven dollars to any person who shall prosecute the same to effect.

Yankee ingenuity soon discovered a method of evading the statute. Only twenty yards being put in each skein, the seller was careful to speak of them as half-skeins; but, as they passed from hand to hand, perhaps some vender neglected this precaution, or perhaps the "half-skein" was too faintly spoken to be heard. As the fine went to the informer, if the purchaser wished to take this advantage he might perhaps be willing to be imposed upon for the sake of recovering the fine. Thus, with both buyer and seller there was a possibility of advantage in the half-skeins, and it is quite certain that they were popular. The loss by such fraud, we may suppose, ultimately fell on the consumer. Probably then as now, in respect to skeins as to spooled silk, the purchase, if weighed in the balance, would frequently be found wanting. Aside from the half-skein system, there was the inducement to make the thread, by extra labor, go as far as possible. The only limit to the fineness of the thread was the fear that it might be unsalable. As the fair spinners themselves sold their product, they doubtless gauged the fineness of their thread by their capacity as saleswomen.

Trade of that period took largely the form of barter. Having dyed her silk with her own hands, the matron repaired to the country merchant to exchange it for dry goods or groceries. The "shopping" of the present day must be regarded as tame in comparison with those cheery contests of old between buyer and seller, when the value of the offered silk was a question of more delicate adjustment than that of the goods on the shopkeepers' shelves. In contests such as these the

man full often discovered that the woman was his equal. The merchant had to find a market for the accumulated silk in the city. He, too, now wanted to exchange it for goods, but the personal charms of the vender no longer assisted the sale of the skeins. Compared with the Italian sewing-silk, the American was inferior, and often a drug in the market. Consumers found the thread too fine, and of an uneven size that gave it a rough appearance. Frequently the great objection was urged that there was too much floss upon it. The color was often defective, both as to shade and permanence. Notwithstanding all these drawbacks, however, its silk production gave to the town of Mansfield an income of not less than \$50,000 per annum. The labor which produced this sum interfered little with the other work of the household, and was vastly more profitable.

Such were the characteristics of the silk industry in this country prior to the introduction of machinery that was to supersede the spinning-wheel. A lad employed as a "throwster" in an English silk-mill was the means of bringing about this great change. (In 1827 or 1828, Edmund Golding, of Macclesfield, England, determined to seek his fortune in the United States. He was then seventeen years of age, and he expected to find ready employment as a "throwster" in an American silk factory. Great was his disappointment at finding there was nothing of the sort in this country; and that even at Mansfield, the head-quarters of the silk industry, no process but that of hand-spinning had been adopted. He sought employment in the town in vain; and he had reached his last sixpence, and was in threadbare garments, when Mr. William A. Fisk, a trader, offered to give him food and shelter for whatever work he could do—an offer that was gratefully accepted. A neighbor of Mr. Fisk, Mr. Alfred Lilly, a manufacturer of screw-augers and auger-bits, took an interest in the lad, and invited him to spend the evenings at his house. Golding there described his previous occupation. The mode of spinning silk by machinery, as then practised in England, was thus in a general way explained to Mr. Lilly,—Golding making rude sketches of the winding, doubling, and spinning frames. Mr. Lilly readily comprehended the details of the manufacture, and foresaw no great difficulty in attempting it.

The three thousand pounds of raw silk which were then annually produced in Mansfield could only be disposed of when converted by hand manufacture into sewing-silk, and for the most part had to be offered in barter. Mr. Lilly hoped that by means of machinery a sewing-silk could be made equal to the Italian, and, like it, capable of being sold

for cash, instead of being exchanged for goods at irregular valuations. He was fully acquainted with the praiseworthy efforts which his townsmen, Messrs. Hanks, had already made in endeavoring to spin silk by machinery; he was further apprised of their utter failure, both in demonstrating that the manufacture of sewing-silk by machinery was practicable, and in awakening a public interest that might have carried forward the undertaking. Not discouraged by these facts, he brought the subject before Captain Joseph Conant and Messrs. William A. Fisk, William Atwood, Storrs Hovey, and Jesse Bingham, and with them eventually formed a copartnership, under the name of the Mansfield Silk Company, for the manufacture of silk by machinery.

Each member of the company was required to pay \$50 at once, and could be assessed from time to time for further payments till he had contributed \$700 to the concern; having reached this limit, he could not be required to pay more. Mr. Atwood was chosen as treasurer and business agent. He was a competent man of business, besides having some special knowledge of silk. He had produced for several years on his farm an annual average of not less than 130 pounds of raw silk, which he had disposed of to advantage after it was made into sewing-silk and button-hole twist. Mr. Lilly had charge of procuring the machinery. A portion of this was made in his own shop, and the remainder was obtained from regular machinists. A room and power having been temporarily provided, the machinery when ready was put in motion, under the direct charge of Edmund Golding. Afterwards the company purchased a building and power (which had been used for the manufacture of wool) situated in Gurleyville. Thither they moved their machinery. To this day the building is known as "The Williams Silk Mill."

The serious difficulties of manufacture soon became manifest. The machinery was very crude, and a Yankee "throwster" of seventeen to-day would scarcely recognize it as bearing any relation to the work. It was capable of doing all that Mr. Golding had claimed for it, but it proved inadequate for the manufacture of American silk as that was then reeled. Finding themselves unable to carry out their original project, since Mr. Golding could give them no hint at improving the reeling, they took his advice in importing raw silk from England. Mr. Ezra Goodridge, of New York, was the importer through whom a small quantity of ordinary reel Taysam, Brussia, and long-reeled Canton raw silk was obtained. This purchase was a great curiosity in Connecticut, and the manner of working it was a mystery to outsiders. Mr. Golding

proved competent in the art of winding the silk, and also in teaching it to a few girls, though they found difficulties in their work which would be laughed at by a winder of the present day. But Golding's lack of knowledge about reeling — his chief acquaintance being with the business of winding and spinning organsine and tram — made their attempts to compete with the Italian sewing-silk unsatisfactory, although their product was superior to the home-made skeins.

The company were cheered by the hope of better success in weaving silk, and in this branch of business Mr. Golding was better able to encourage their hopes. In the Spring of 1829 the Mansfield Silk Company was incorporated by the legislature, — a circumstance which directed public attention to their efforts, and occasioned wide-spread interest in the growth and manufacture of silk. People made long journeys to see the machinery in operation, and letters of inquiry were numerous. Among the visitors was a Mr. Brown, by birth an Englishman, who was engaged in the tassel manufacture at Boston, and was anxious to obtain his stock as cheaply as possible. He was familiar with the true process of reeling, and explained it to the company. They had a reel constructed under his direct supervision.

The unquestionable success of the new reel gave fresh life to the enterprise. The company advertised their willingness to purchase all the cocoons that might be offered, and their purchases were large. A small building, with power, was devoted to reeling. Improvements were rapidly made, patented, and adopted, in the reels driven by power. Not only was the reeling perfectly successful, but the native silk was found to be of superior quality and strength, winding and doubling with greater facility and less waste than China or Brussia silk.

Instead of being a drug in the market, American silk now became an object of demand, and the company took measures to increase the supply. The hardy native white mulberry was the sole source of food for the silk-worms. The seed of this tree was carefully gathered in Mansfield for the company, and in the spring following they took measures for extensive planting. Their agents were sent into different sections of Connecticut and neighboring States, with instructions to lease for a term of years suitable land for nurseries, and to arrange with the owners of the land for aid in planting, and for subsequent care. The agents were to revisit the nurseries from time to time, as often as might be necessary to ascertain that they had proper attention, and to secure successful growth.

In the Spring of 1832 the company appeared before the legislature to ask State aid for encouraging the culture and manufacture of silk. The Governor, with members of a legislative committee, visited the company's silk-mill, and took great interest in examining the materials used, and the machinery and processes of manufacture. Some specimens of the goods made — such as vest patterns and handkerchiefs — were presented to the visitors. The result was an act of the legislature containing the following provisions:—

Whoever shall transplant one hundred white mulberry-trees of three or more years' growth, on his, her, or their land, within this State, adapted to the growth and cultivation of the same, at such distances from each other as will best favor their full growth and the collection of their leaves, shall receive, at the end of two years next after said trees shall have been transplanted as aforesaid, one dollar, and in the same proportion of a greater number transplanted as aforesaid, upon proof and certificate thereof as hereafter prescribed, and that such trees were, at the end of two years after transplanting as aforesaid, in a healthy and growing condition.

It was also enacted that, where silk was reeled from cocoons by the improved method, fifty cents per pound should be paid to the person reeling it, or causing it to be reeled. A bounty of \$1,500 was bestowed upon the Mansfield Silk Company.

A general interest in silk culture was excited by this legislative action; and Pennsylvania, New Jersey, Massachusetts, and Maine, following the example of Connecticut, offered bounties for cocoons and raw silk raised within their borders.

Among those who closely observed the principles of the machinery employed in the silk-mill was Nathan Rixford. He had just established himself as a builder of machinery at Mansfield Hollow. Scarcely was the machinery of the mill complete, when this young man projected considerable improvements upon it, and began construction accordingly. Doubling and winding frames and a spinner made upon his plans were a notable advance on the English machinery of Golding, and many marked features then introduced by Mr. Rixford are retained among the improvements of the silk manufacture of to-day. His success attracted attention. He soon began to receive orders from different parts of the country, and for several years was the principal builder of silk machinery. Prominent among the earlier silk culturists and manufacturers were Jonathan H. Cobb, of Dedham, Mass.; the Nantucket Silk Company, of Nantucket, Mass.; Samuel Whitmarsh, of Northampton, Mass.; and Cheney Brothers of Manchester, Conn. Mr.

Whitmarsh and others introduced new varieties of mulberry-trees, prominent among which was the much-vaunted *Multicaulis*, and of less celebrity, though more value, the Alpine and the Brussia, the two latter being really worthy of cultivation in this country, while the former, by its utter and wide-spread failure, after being absurdly over-rated, brought loss and disgrace on the entire silk industry of the United States.

A few words may be devoted to the "*multicaulis* fever." Haste to be rich led the way. Instead of the old method of planting mulberry orchards with the well-known and hardy varieties of the tree, the system was adopted of securing from trees of a single season's growth leaves fit for feeding. For this purpose, planting in close hills or in hedges was necessary, and the *Morus multicaulis* was the favorite tree. Its luxuriant growth, when stimulated, was indeed remarkable. Its leaves, fed to the worm, produced a silk that was not equal in quality to that from the white mulberry. The trees had to be housed in winter, either in cellars or in earth-vaults. Notwithstanding the objections to it, the *multicaulis* grew rapidly in popular favor. Rarely was a garden or a cultivated spot to be seen without this tree. A demand for the trees themselves sprang up, — a demand that gave them an absurd and factitious value. Prices ranged for trees produced from one bud or cutting, and of a single season's growth, from five cents to ten, twenty, fifty cents, one dollar, and in some instances five dollars apiece. The value of trees became greater than that of the silk that could be obtained by them; the trees were worth too much to be used for silk culture, and the raising of these trees became a speculative business of great activity. The excitement reached its culminating point in 1839, when the fortunes of many thrifty men who had embarked in the enterprise were wrecked in bankruptcy. Even then, although the failure of the *multicaulis* was assured, the mania for raising mulberry-trees was not abated, hardier varieties being its objects. The writer was witness to an instance of the height to which this excitement carried prices, and places the facts here as a matter of record. Two trees of one season's growth, raised by Elder Sharp, of North Windham, Conn., were sold, standing in his nursery, in August, 1842, after due advertisement, at auction. The first one offered brought \$106, the second \$100; and further sales were withheld because the bidding was not considered as sufficiently spirited. Disaster followed this baseless speculation, as might have been anticipated, when the price of the trees exceeded the worth of the prod-

uct; and in 1843-44 the fabric of artificial values collapsed. A deep reaction in popular feeling took the place of the former excitement; and the whole business of silk culture sank into disfavor, along with the costly and now neglected mulberry-trees. A blight of a general character, to which even the hardy white mulberry yielded at last, gave the finishing blow, and silk culture in America ceased to exist.

From 1828 to 1844 the members of the Mansfield Silk Company passed through sixteen years of varied experience, which must remain for the most part unwritten. They were men not wanting in thrift or enthusiasm; but they lacked capital, and their ignorance of the business of manufacture frequently made them the dupes of unwise experiment. Their attempt at weaving, though they succeeded with vest patterns, handkerchiefs, and some other goods, must be pronounced a failure, both as to the quality desired, and from a pecuniary point of view. They exceeded their first limit of \$700 assessment, and each paid in more than \$1,000, besides devoting abundant time and effort; but the result was at last disastrous. Before their final dissolution, the company let their establishment to others who carried on the silk manufacture. But to the original company must be accredited the honor of having originated the business, and the popular interest in it which has since carried it onward.

Mr. Lilly was himself the first to sever connection with the company. He failed in his regular business in 1835, and attributed his misfortune to his interest in silk manufacture. It was, perhaps, the last straw on the camel's back. He was past the meridian of life, and his wounded feelings never recovered from the shock of his failure. His interest in the company was appraised and sold, in the settlement of his estate, for \$350. The dissolution of the company took place in 1839,—William A. Fisk, Jesse Bingham, and Storrs Hovey withdrawing altogether from the business. A small but prosperous enterprise was carried on by Captain Conant and William Atwood, associated with Harvey Crane, in the manufacture of sewing-silk and button-hole twist. About the year 1840 the New York and Northampton Silk Company employed Captain Conant as their agent. They had then been in existence since 1834, and hoped that the Captain could retrieve their waning fortunes. In this he did not succeed; but he spent several years in Northampton, principally engaged in the silk business; at last returning to Mansfield. In 1853 he built a small silk-mill and dye-house upon ground newly broken for the purpose

A few houses have gathered around this site, and it is known as Conantville. The company formed by Messrs. Atwood and Crane with Captain Conant dissolved at his departure; and Mr. Atwood built a small mill (using the Rixford machinery), a dye-house, and other appropriate structures, on Mount Hope River. His undertaking was crowned with success. Mr. Atwood was at the time of his death, in 1851, the leading silk manufacturer of the town, which still bears the name of Atwoodville.

To close this portion of our history, it is only necessary to follow the fortunes of Mr. Golding. After the dissolution of the Mansfield Silk Company he was associated with Messrs. Zalmon Storrs & Son, and in 1843 had been for some time engaged with them in the manufacture of sewing-silk. They built a small, neat mill in Mansfield Hollow, equipping it with the Rixford machinery. During ten years their associated efforts were prosperous. After they dissolved company, Mr. Golding bought land and water-power at a site one mile to the north-east of Mansfield Centre, and there broke ground for a new silk-mill. The canal was partly excavated, and some of the stone had been gathered for the building, when Mr. Golding was taken ill, and, after a brief illness, passed away. The gathered stone and ground broken for the mill still remain untouched,—a sad monument to this pioneer of the silk manufacture of America.

It was not proposed in this rapid sketch to name all those whose efforts in the infancy of the silk business contributed, through years of struggle and difficulty, to its ultimate success; nor is it possible here to assign the share of honor that is due to each, where all devoted their best endeavor. But the important relation which the dyeing of silk bears to this industry, makes it necessary that some incidents connected with that branch of the business should be placed on record. The first in this country to make a business of silk-dyeing, and to improve its processes, were Edward Vallentine and Lewis Leigh, who had been practically engaged in this occupation in London, England. They came to the United States in 1838, and in August of that year Mr. Vallentine began business as a silk dyer at Gurleyville, Conn. He soon obtained the patronage of most of the silk manufacturers in that vicinity, gaining a reputation by the use of new and brilliant colors and a permanent black, that were much admired. About 1839-40, doubtless under inducements held out by the New York and Northampton Silk Company, Mr. Vallentine removed to Northampton, Mass., where he carried on the business of silk-dyeing successfully. Although

of apparently robust constitution, he did not survive the meridian of life. His death occurred in 1851. Mr. Leigh, who is still living, is regarded by the craft as a master in the art of silk-dyeing; and to his and Mr. Vallentine's efforts must be given the credit of having done much to establish this branch of industry.

At least one incident connected with the importation of raw silk deserves mention. When the American raw silk was properly reeled, it took precedence of any that was imported, being more easily worked. At the suggestion of Mr. William Atwood, about the year 1840, Mr. Ezra Goodridge, of New York, sent a sample skein of American silk to China, with an order for a few bales of an article to be similar in all respects. In compliance with this order, an invoice came of silk described as "re-reeled Canton." The skeins were fac-similes of the American sample. They gave great satisfaction; and up to the present time, silk of this character has been the subject of large importation.

The amount of our imports of raw silk may now be taken as the measure of the silk industry, which, as we have seen, began with home growth and a home manufacture originally dependent upon the native product, and gained sufficient foothold to survive the extinction of American silk culture. The earlier importers of raw silk in New York exhibited commendable enterprise in fostering our infant silk manufactures, and bore their share of the losses which usually attend new enterprises. At the present day the number of importers is largely increased, to meet the demands of a business amounting to 1,250,000 lbs. of raw silk annually, of a gold value of \$7,500,000.

Among the large manufacturing establishments which create the demand for these importations, may be mentioned that of Messrs. Cheney Brothers, at Manchester, Conn., which has arisen out of the ashes,—destruction having likewise overtaken their earlier efforts in raw silk culture. They are now the leaders in the American silk industry, and are successful in spinning, weaving, dyeing, and all other branches of the manufacture. The Nonotuck Silk Company's establishment at Florence, Mass., which is an outgrowth upon the ruins of the New-York and Northampton Silk Company, next deserves mention. Sewing-silk and machine-twist are the specialty of this concern, which gives employment steadily to more than 400 operatives, manufacturing more than 80,000 lbs. of raw silk annually. There are in all, at the present time, 156 silk factories in the following States: New York, New Jersey, Pennsylvania, Maryland, California, Kansas, Connecticut, Massachusetts, New Hampshire and Vermont. They give employment to about 12,000 operatives.

The production of raw silk in this country, which in 1828 amounted in Mansfield alone to 3,200 lbs., and which ceased entirely in 1844, has since been revived in California, meeting there with a modified success. There is no good reason why it should not be again extended throughout the United States. Since the introduction of the mulberry seed by Dr. Aspinwall in 1766, the history of this culture has been pregnant with encouragement, and only a fortuitous conjunction of misfortunes checked it. American silk, the quality of which is known to be superior to any that is imported, would have to-day a cash value and an inexhaustible home market. The subject of silk culture in the United States deserves special consideration from the Silk Association of America.

FLORENCE, Mass., February, 1875.

Industrial Miscellany.

PROFESSOR SANSON ON PRECOCIOUS MERINOS.

WE invite the attention of sheep-growers to the important communication of Professor Sanson, the celebrated zoötechnist of France, which we have translated from the *Comptes Rendus* of the French Academy. The publication of his note by that distinguished body is a sufficient indorsement of Professor Sanson's scientific authority. In a former number of the "Bulletin" we reviewed Professor Sanson's book upon sheep.* A reference to that article will show the system of culture which he recommends, and which we will rapidly present as essential to a full understanding of the note which follows. It appears that the best sheep-growers in France regard the development of the Merino race as the first object to be sought for in that country. According to Professor Sanson, it has been proved that the Merino race is capable of the same development in precocity and in the production of flesh as the English Down races, which had been improved by Ellman. He says: "We can procure in France, with the same degree of precocity, and in the same conditions, as many Merino rams as South Downs. The former, at the same age, weigh as much, if not more than, the latter. They give as much meat as,

* Vol. II. page 117.

if not more than, the latter, and of an unquestionably better quality." He shows that the Merino has been so perfected as to remove the folds of the skin, that it has acquired a chest broad and low, indicating a thick and cubical body, with broad loins and widely extended haunches, with limbs relatively short and set *aplomb*; in short, that the perfected Merino has acquired a conformation almost identical with the South Down, reputed to be the best producer of flesh. The Merino has been transformed into the most perfect mutton sheep,—maturing at an early age, and yet preserving all the qualities of wool which give the peculiar value to the Merino. It is to the latter point, namely, that the Merino, while becoming a mutton sheep, preserves its wool-bearing qualities, that the following note applies:—

PROFESSOR SANSON'S NOTE.

It is generally admitted, from reasoning *a priori*, that the absence of folds of the skin in precocious Merinos must necessarily diminish the extent of the surface covered with wool; and that the rapidity of the growth, due to the abundance and special qualities of nourishment, cannot fail to increase the size of the hairs of the same wool. I have proposed to determine scientifically the truth of these two inductions. My researches were made upon twenty-two specimens collected during an excursion made with the students of the School Grignon, on the 23d May, 1872. The details, and the discussions which they involve, will be the object of a complete memoir to be published hereafter. In the mean time I ask permission to expose in the present note the principal results and conclusions which appear to me to be interesting to abstract science, as well as of practical use in the economies of managing animals.

The results are contained in a table (which we omit). Six apparent diameters were taken by Nachet micrometer, from which the real diameter was calculated. From the facts which the table contains, and the economical hints which they give, M. Sanson considers the following propositions demonstrated:—

1. The precocious development of Merino sheep having the effect to carry their aptitude to produce flesh to the highest degree that sheep can attain, exercises no influence upon the fineness of their wool. This preserves the diameter which it would have had if developed in normal conditions, for the reason that this diameter depends upon the individual and hereditary aptitude.

2. The influence exercised by the precocious development upon the hair of the wool exhibits itself by an augmentation of the length of the same hair, its growth, resulting from the formation of epidermic cellules in the hair bulb, being more active. There is, therefore, more woolly substance produced in the same time.

3. The precocious development does not appear to have any influence upon the number of curves or crimps which exist in the hair for a fixed length. It has no effect upon the form of the curves, which, like the diameter of the hair, result from the individual and hereditary aptitude.

4. The precocious development does not vary the number of hair or wool bulbs existing for a determined extent of the surface of the skin. It produces, therefore, no change in what is vulgarly called the *tasse* (density of staple) of the fleece. The modifications which the staple of wool presents in this respect are only apparent. By increasing the length of the hairs, the precocity necessarily increases that of the locks of wool which they form, which makes the fleece appear less dense.

5. The quality and quantity of the yolk are not modified by the precocity of development. They remain what they would have been if the animal had been normally developed, as is proved by the differences observed among subjects equally precocious. This demonstrates that the quality and quantity of the yolk depend upon an individual aptitude susceptible of being modified by heredity.

6. The precocity of development increases the total weight of the fleece. This proposition was implied by the preceding, which explains it. In fact, from the moment that the diameter and number of hairs do not diminish, while the length increases, there must be necessarily an increase of substance, the relative quality and quantity of the yolk remaining the same.

7. The commercial value of the fleeces of precocious Merinos is increased in proportion to that of the common Merinos, not only by reason of their greater weight, but again by reason of the more constant value which belongs, *pro rata*, to combing wools, according to their length.

8. Far, then, from having diminished the importance of Merinos as producers of wool, by making them acquire a precocious development, which has had the effect to transform them into excellent producers of flesh, it is found, on the contrary, that it has increased this importance, and that, in the new economical conditions as in the old, the Merinos have preserved the first rank which belongs to them among the ovine races.

ISLAND SHEEP HUSBANDRY.

On page 187 of the present volume of the "Bulletin" the reader will find a letter of Mr. Gilbert Longfellow's on the Sea Island Sheep of Maine. The writer's domain is an island of about 1,400 acres, situated in Englishman's Bay, south of the town of Jonesboro', Maine. His flock consists of about 400 sheep, who "get their own living all the year round, — feeding in the winter on dried grass, moss when they can get it, twigs from the trees and bushes, and *sea-weed that grows or washes on shore*. It would seem that this letter attracted

considerable attention in Maine, as we find the following in the last issue of the "National Stock Journal:" —

SHEEP HUSBANDRY IN MAINE.

Our Maine friends seem to have suddenly awakened to the advantages presented by the islands along their coast for sheep-raising. It is estimated that the islands along the coast have a combined acreage of 200,000 acres. Sheep have been raised upon many of them, but it is now proposed to stock them all with sheep. Each sheep-owner controlling the whole of an island will require no fences to keep out his neighbors, no dogs to keep away the wolves, and no shepherds to keep away the dogs. The way they propose to manage is to simply turn out the sheep and let them run, to pick their own living among the rocks, and from the sea-weed which the ocean throws up in large quantities. The ocean modifies the climate to such an extent that there is but a brief interval in the winter when the sheep require attendance; and it is proposed to carry them over the interval on a diet of *fish*.

Mr. Longfellow has added to our obligations by sending us a second letter, which gives facts of great interest in illustration of the aptitude of sheep to conform to varying conditions of climate and food: —

J. L. HAYES, Esq.

MACHIAS, March 4, 1875.

DEAR SIR, — As you appeared interested in my reply to yours of April 21, 1874, and ask for the "smallest particulars" in relation to my sheep, and as I have a "few left," I thought I would send some. I ought to say, if I have not, that I am a novice in the sheep business. When I came to the island six years ago, I hardly knew a sheep from a pig, and I have not progressed very far in sheep knowledge yet. What I state as *facts* I believe to be so; but my opinions *may* and very likely *will* change as I advance. When I read of the feed, shelter, care, &c., that country farmers feel obliged to give their sheep, and compare it with what island sheep get, I am led to the conclusion that an island or sea-shore life changes the nature of the animal. I have bought several barn-raised bucks since I commenced. The first one I turned out, and the next February took up barely alive; the second year he weathered it till about March. The others did about the same. But sheep *born* on an island, if they get through the first winter, seem to be all right. I read about sheep requiring an acre of pasture to a sheep. Let me relate a "small particular" which took place last summer. In shearing time (about June 10) I told my shearers, if they found any they thought would not winter, to select them, and I would take them home and dispose of them. They found seven. Three of them had lambs; the same number had not a vestige of a front tooth, both jaws alike; the balance had a few little stubs. I put them in an enclosure containing about five acres. Of this amount at least one acre was waste, being ledge, thick woods, and swamp; the balance

very poor, never having been plowed. I scattered a little seed on part of it last spring, which could not have done *much* good. One day — the last of my shearing — we tried to drive a flock to the barn: part were sheared, part not. In driving them by this pasture, they jumped in from the top of a rock. I then took down a portion of the fence, and six men and three boys could not drive them out, after chasing about an hour. Each man then singled out a sheep, run it down, caught and sheared it, and put it over the fence. This left twenty sheep and three lambs in the pasture. Some time in September I wanted some mutton, and with my pistol shot one of the old ones. It cut half an inch of fat nearly all over it. A few weeks later I killed another, not quite as fat, but good eating. I finished killing the old ones about the last of November, and then let the rest out of the pasture. Three of the seven were as fat as the first, the balance good mutton. Although there was good water in the pasture, I never knew one of them drink, and saw no signs to indicate they were in the habit of doing so. I think they do not drink in summer; but in winter I have seen them eat snow, and lick the ice where it was thawed, but never knew them to go to an open brook and drink.

Now for another "small particular." I saw my first lamb about two weeks ago (I think I hear you say *dead*, and he was); a few days after I saw another (alive); and at this writing I know of six alive, notwithstanding the "Arctic wave." Last night and to-day we are having the worst storm of the season. Wind north-east, blowing a small hurricane; snow flying; mercury at 10° at noon. About eleven o'clock, in the midst of the storm, a sheep came up to the barn with a lamb just born. She had a look as much as to say, "Didn't I do well?" I thought so, and drove her in and made her as comfortable as I could. Now, all these things seem to show, that sheep can be kept on the seaboard cheaper than almost anywhere else in the world. There are islands in this vicinity that have sheep that their owners never see, except to catch and shear. There is one drawback: they do not increase as they do around a barn. This is owing to several reasons. One is, not being under the eye of the owner, they are liable to be stolen. Doubtless some are, though I have never caught any one at it. More of them get surrounded by the tide, while feeding on the ledges, and drowned; and some of the lambs, especially late ones, die the first winter. I think all this can be in a great measure remedied by having a good faithful shepherd to look after them. This is an experiment I intend to try when I can find the man. I think a shepherd with his dog would save these awful races we have in shearing time. They are fun for the boys, but a little rough for a man that has upwards of fifty years to drag after him; but (pardon the old fellow) he don't find the boy that catches more sheep than he does. . . .

Yours most truly,

GILBERT LONGFELLOW.

INCAPACITY OF AMERICAN MANUFACTURERS TO COMPETE IN THE MARKETS OF THE WORLD.

In the leading article of this number we have endeavored to demonstrate the truth of the proposition which forms the heading of this article. Since the earlier pages of this number were printed, we have received the Annual Report of the Secretary of "the American Iron and Steel Association," Mr. James M. Swank, which we are proud to refer to as an illustration of the service which industrial associations can render to our material progress. We find in that report the following confirmation of the views which we have less forcibly presented: —

CAN OUR EXPORT IRON TRADE BE INCREASED?

At present no marked increase in our iron exports proper need be expected. Professor J. S. Newberry, in a recent elaborate paper, has well expressed the advantages which English iron-masters possess over their American rivals in the manufacture of cheap iron for the world's markets. He says: "The English manufacturer owes his superiority to three things, viz.: cheaper labor, greater capital, and improved processes." The first two of these advantages are briefly explained as follows: "The English manufacturer has an advantage of \$3 to \$5 per ton in the matter of labor. His greater capital enables him to manage a large establishment with several furnaces by a simple and thoroughly systematized administration, and permits him to reap all the advantages of doing business by wholesale rather than retail, both in buying and selling." Of the improved processes, stress is placed upon the large size of furnaces, the high temperature of the blast, exact scientific attention to details, &c. He might have added that not only does the English iron-master possess, as a rule, more capital than the American iron-master, but he can also borrow much larger amounts, for longer periods, and at much lower interest, by means of which borrowed capital important improvements are frequently made, financial crises are tided over, and sales are effected on long credits. Can the American iron-master compete in foreign markets with a rival who enjoys all the advantages above recited? It may safely be assumed that successful competition in the manufacture of the coarser forms of iron is only possible by such a concurrence of conditions as will wholly neutralize the advantages now possessed by the English iron-master. To secure these conditions here it would be necessary for the strong to absorb the weak; for capital to be consolidated; for rates of interest to be reduced; for wages to be uniformly lowered to the foreign standard; and for such improved processes as effect a saving of labor and material to be generally substituted for methods which have been established at great expense. Some of these conditions might be realized without great

detriment to the public welfare or to private interests; but others are clearly unattainable except by the imposition of burdens which could not be justified by any possible resulting advantages whatsoever.

To tear down a blast furnace because it is not constructed upon the latest model, — does not, for instance, have a Whitwell stove, — or because the ore and fuel consumed by it are not found in juxtaposition in the same neighboring hillside; to abolish all hand puddling furnaces and put machine puddlers in their place; to require every rolling-mill owner to make his own pig-iron and thus save the profits paid to the furnace-man, — all these would be cruel and unnecessary hardships, and would involve great waste. As well ask the owner of a square piano to destroy it because it is not a grand piano, or advise the owner of a New England farm to give it away because it will not produce cotton. To ask the owner of a small furnace stack to quit business, because he cannot make iron quite so cheaply as the rich company which owns four or five stacks, would not only suggest a wrong to the small manufacturer and all his dependent workmen and neighbors, but it would suggest a preference for giant monopolies over those individual enterprises the fostering of which is one of the glories of our republican institutions. Economy in the production of iron is commendable; but the policy which crushes the weak and exalts the strong is not economy, but brigandage. Nor can we afford to destroy all establishments except those most recently built, for to do this would be to cut off three-fourths of our productive capacity.

But the item of cheap labor — as cheap as that of England, or Wales, or Belgium — is of itself an impediment to the realization of any dream of immediate successful competition by American iron-masters with their foreign rivals in distant markets. For economic as well as moral and political reasons, this country does not wish its labor to be so poorly rewarded as that of Europe. If it were possible to so degrade it, the interruption to the general prosperity which would surely follow would not be compensated by any advantage that might be gained in supplying either the home or foreign market. The experience of this nation proves that, with high wages, the consumption of all products is at its maximum, and the people are prosperous; and that when wages are low, as they are to-day, consumption is at its minimum, and all interests suffer, even those of the money-lender. The experience of European nations proves that low wages mean poor food, shabby clothing, uncomfortable and unattractive homes, but little schooling for the children, and no hope for fathers or children of getting on in the world. Low wages in this country would produce like fruits. We would have, as a result of their permanent establishment, an ignorant, degraded, imbruted, crushed, and despairing population of working people. To impoverish and degrade our people, by reducing their wages so low that we may make iron or any other product as cheaply as our foreign manufacturing rivals, is not desired by any humane and patriotic American. Unless such a result is reached, we cannot make iron so cheaply as Welsh and English and

Belgian iron-masters, and the supply of foreign iron markets must be left to these and other rivals.

But, were it desirable to reduce the wages of our labor to a level with the wages of European labor, it would be impossible to do so; and this fact alone is fatal to any enthusiastic hope of seeing our foreign iron export trade greatly increased. If American working-men could be content to receive present European wages, the influx of skilled immigrants from Europe to this country would stop, as it has now almost stopped; the labor markets of Europe would be crowded, as most of them are now crowded; and the result would be that wages would be forced down in Europe, as they are now being forced down, to a level so low that we could not compel our labor to accept such degradation. Low wages here would result in still lower wages abroad, and consequently would not advance the development of our foreign export trade. It is a well-known fact that the wages of English and Welsh working-men have fallen as rapidly during the past year as the wages of American working-men.

There is, however, a phase of our foreign export iron trade which presents only encouraging results. Our exports of the *manufactures* of iron and steel have steadily increased within the last few years. American-made locomotives, machinery of all kinds, tools, car-wheels and other castings, nails, agricultural implements, sewing-machines, fire-engines, fire-arms, &c., are in demand in many foreign countries because of their combined cheapness and excellence and the novelty of their styles. In the supply of such manufactured products we can now compete with other countries in foreign markets. Our locomotives are sent to Russia, Brazil, Chili, Canada, and other countries; our Pullman cars to England; our sugar-mills to Cuba and Porto Rico; our saws to Sheffield; our shovels and axes to Australia and to other countries; our machine tools to all parts of Europe; our iron bridges to Canada and to South America; our agricultural implements to Mexico and to many European countries; our sewing-machines and a long line of other manufactures of iron and steel to every quarter of the globe. We owe our foreign trade in these commodities mainly to the intelligence and ingenuity of our countrymen, who have sent to other countries many mechanical inventions and improvements which they were glad to receive and pay for, and have since been slow to copy in their own workshops. The inventive genius of our people has also contributed to the extension of our foreign trade in other manufactures of iron and steel by contriving labor-saving machinery by which we have been able to produce these commodities more cheaply and more perfectly than our European competitors. Our export trade in manufactures of iron and steel has therefore resulted from the *elevation* of our labor, — not from its degradation. Without the stimulus to invention which accompanies high wages and the intelligent, hopeful manhood evolved from them, the building up of this trade would have been impossible, for we would have possessed no advantages over our rivals. Without high wages we would especially never have been able to induce skilled working-

men from other lands to come here to aid in making this the great manufacturing nation that it is.

Our growing export trade in the manufactures of iron and steel is a direct result of the protective policy, which has encouraged capitalists to embark in manufacturing enterprises; enabled them to pay high wages; inspired them and their workmen to invent new processes and labor-saving machinery through which a cheapening of the cost of production has been accomplished; and made it possible for them, through the intelligence of the workmen reared in their own shops or brought from other lands, to produce goods and wares of superior excellence. If this policy were reversed; if manufactures were discouraged and wages were permanently reduced; if invention and improvement and production itself were checked by a glut in our markets of cheap foreign goods; if the enterprise and faith which lead our manufacturers to seek foreign markets, as Englishmen, Frenchmen, and Germans seek them, were chilled and shaken by a decrease in orders at home, — we would soon see an end to our export trade in all the products of skilled industry which compete with similar products of foreign manufacture.

But better than all exports — better than all foreign trade — is the control of our own markets, which brings with it the contented employment of our own people. Our battle is still a defensive one. Our exports in 1873 of \$16,000,000 worth of iron and steel and their manufactures give us nothing to boast of when compared with our importation in the same year of \$45,000,000 worth of like products. Until these figures are reversed, let no friend of American industry, especially its iron industry, be deceived by the wretched fallacy that the day of our industrial independence and supremacy has come.



THE DEFEAT OF THE CANADIAN RECIPROCITY TREATY.

We cannot be too thankful that the Canadian Reciprocity Treaty has been rejected by the Senate. No interests would have suffered from it more than the wool-manufacturing and wool-growing industries. These interests happily cannot reproach themselves with negligence in placing their views before the Senate. It is satisfactory to know that the first formal pronouncement against the treaty was issued by the Government of our own Association, convened for action on the matter, at the first notice that the scheme was in incubation. But we have to thank others vastly more than ourselves. Our acknowledgment of gratitude is first due to Mr. Blaine, who led the attack on the treaty in his remarkable speech in Maine. So great is the public confidence in his political sagacity, and so strong the belief of many that he will yet occupy a much higher position than that of Speaker,

that Mr. Blaine was more powerful by his influence than his arguments, powerful as they were, though brief. The honors in the argument against the treaty are to be divided between Mr. Carey, Mr. Morrill, and Mr. Kelley. Remarkably diverse as these arguments were, the reasoning of each of these gentlemen was insurmountable. Admiring each, we cannot fail, above all, to recognize the cumulative obligation which we owe to Mr. Carey. The brilliancy of his work is absolutely undimmed by years; and, although now our Nestor, he is still our Achilles.

THE INTRODUCTION OF FANCY CASSIMERES.

WE are permitted to publish the following interesting letter. . The first fancy cassimeres were made and were woven on hand-looms, by Bonjean, of Sedan, France, in 1834. Before his invention, all woollen cloths were woven plain. It appears by this letter that, six years afterwards, Mr. Crompton succeeded in weaving the fancy cassimere by power, and thus his name is identified with the most important revolution in cloth-making of modern times. We hope that Mr. Lawrence, whose service to the wool manufacture of New England is so notable, as in his introduction of the manufacture of the "Bay State shawls," will give us other notes from the vast stores of practical knowledge in his possession.

STOCKBRIDGE, Dec. 14, 1874.

GEORGE CROMPTON, Esq., Worcester.

MY DEAR SIR, — Having had a most agreeable acquaintance with your honored father in the early history of your famous loom, and knowing it to have been a golden heirloom to you, I thought it would be interesting as a matter of history in our industrial pursuits, that the circumstances of its becoming so distinguished in woollen fabrics be narrated. Not a yard of woollen fabrics had ever been woven by power-loom in any country till done by your father at the Middlesex Mills, in Lowell, in 1840. Your father invented this loom in Taunton, Massachusetts, in 1837; took it to England the next year, where it was patented; and he filled one cotton-mill there with them, and started it successfully; then returned to this country late in 1839. Early in 1840 he was in Lowell, with specimens in cotton fabrics of what his loom could do. At that time I had charge of the Middlesex Company, and saw them, remarking that woollen fabrics were only worn with plain surfaces, and his loom could not be used for them. The cotton manufacturers in Lowell did not see it was for their interest to change their fabrics, and your father returned to Taunton.

Within ten days of this interview, my early friend, William B. Draper,

arrived in Boston, from Paris (where he had lived fifteen years), and came to pass a night at my house in Lowell. He had an overcoat woven in diamond figures of great beauty ; said he saw it at an Exposition in Paris, — Bonjean & Son, of Sedan, were the manufacturers, — and it was as sure to be popular as the sun was to rise. He gave me a small bit from inside the collar, and the same day I sent a man to Taunton for your father. Both returned in a few days, bringing one of his original cotton looms, with which we experimented till its practicability for woollen fabrics was demonstrated. Your father continued with the Middlesex Company two years, and I saw him daily. He was modest and gentle, and impressed me with the belief that he was highly gifted with genius. The attentions shown you at the last Imperial Exposition in Paris, by the leading woollen manufacturers of Europe, show that the services of your father and yourself are as highly appreciated abroad as at home. I am rejoiced to hear of late marvellous improvement in the harness motion, and hope the prosperity of this country will be further identified with the genius and ability of your family.

I remain your friend,

SAMUEL LAWRENCE.)

THE NEW ORGANIC SULPHURET DYES.

WE have received from Germany, accompanied by specimens of the dyes, a communication from which we make the following extract. We confess our incredulity of the extraordinary statements which this article contains, until we had seen them verified by a notice in the "Bulletin" of the *Société Industrielle* of Mulhouse, to which we shall hereafter more fully refer : —

Scarcely have the wonderful discoveries in the manufacture of the artificial madder dyes entered into the field of industry, than a new invention has been made, which leaves behind every thing that has thus far been accomplished in this domain.

By the new process of Messrs. Croissant & Bretonnière, for which patents have been granted everywhere, — even in Prussia, — the most common and cheapest organic substances can be converted into coloring matters, which fulfil all conditions that may be required. Such organic materials hitherto applied are: wood, sawdust of all kinds, human and vegetable detritus, lichens and mosses, bran, farina, gluten, starch, fecula, sugar, glucose, cellulose, paper and cotton waste, tannin, gallic acid, gelatine, caseine, fibrine, albumine, blood, horn, soot; tartaric, citric, and formic acids, and their alkaline salts; resins, such as galipot, aloes, guaiacum, dragon's blood; gum resins, such as gum tar; gum, such as gum tragacanth, gum arabic, — in short, most, if not all, organics may be converted into colors by the new process.

The great advantages of this invention are evident, especially if it is known that the necessary chemicals belong to the cheapest ones obtainable.

1. The process of manufacture is exceedingly simple; it requires neither costly nor complicated apparatus, and little labor. Regarding the operation itself, it requires no skilful labor, and yields satisfactory results with but little attention.

2. The intensity of the new dyes surpasses that of most other colors.

3. They are very durable, and resist acids or alkalies better than any dyes known.

4. They are cheaper than the most common dyes. One pound of color from sawdust is, for instance, only about half as dear as logwood extract, and yields four times as much coloring matter.

5. By the new process all shades can be produced directly.

By the new invention colors can be produced in the most simple manner, and with little cost, from materials occurring everywhere, and having but little value. It allows further to produce an almost unlimited number of tints, with the exception only of red, blue, and green; i. e., such colors which, thus far, could not be made of great durability.*

The new colors are soluble in water, and, what is very important in calico printing, they adhere without any mordant. They are applicable on wool, cotton, linen, silk, wood, leather, and paper, and are used like other colors. They are fixed with bichromate of potash or metallic salts. In dyeing wool or silk, any surplus of alkali is neutralized by an acid.

The *Société Industrielle* of Mulhouse (Alsace) has expressed itself very favorable on these colors, and is shortly to publish an extensive report. Very favorable testimonials were also given by dyers from Lille, Roubaix, Tourcoing, Rouen, Chalet, and Laval, and for one year and a half the inventors have carried out their process in their own factory. Hence the question is not to introduce something problematical, but to found an industry, the products of which are well known in France as "grand teints," and also in Germany.

The communication, which is dated at Frankfort, and signed Worth & Co., who appear to have an agency in Newark, N. J., was prepared with the object of selling the rights to the patents in this country, and concludes with a statement of the profits to be derived from the manufacture. They state that 100 lbs. of the new coloring matter, which costs £3, are equal in dyeing power to from 300 to 450 lbs. of extract of logwood, costing £5 3s. per 100 lbs.

The number of the "Bulletin" of the *Société Industrielle* of Mulhouse for October, 1874, contains the memoir presented by the inventors upon the "Organic Sulphurets," — the name which they give to the new tinctorial products. The article is too long and minute

* This is too strongly stated. None of the pure or chromatic colors are produced.

for publication, but we give to our readers some of its most important points.

The inventors commenced studying the organic coloring substances in 1868, with a view of modifying their constitution and obtaining new results in dyeing. Abandoning their experiments upon materials already used in dyeing, they attempted the treatment of different organized bodies having naturally no coloring properties, such as farinas, starch, malt, and sawdust. These bodies, under the influence of heat and caustic soda, were transformed into oxalate of soda, but acquired no coloring powers. The idea then occurred to the inventors of modifying the constitution of these organized bodies by introducing a new element capable of removing the hydrogen from them. The substance which they finally fixed upon, on account of its low price, was sulphur. The method adopted was to treat these organic substances with sulphuret of sodium, at high but variable temperatures, according to the body acted upon. The sulphur removed the hydrogen by causing the disengagement of sulphydric acid, and, by virtue of the laws of substitution, the atoms of hydrogen were replaced by an equivalent number of atoms of sulphur, forming a new body, which had acquired by the action of the sulphur tinctorial qualities in which it had before been completely wanting. All the substances already enumerated in the extract with which we commenced this article have been converted into coloring material. The inventors regard those produced from sawdust as the most important, from the worthlessness of the raw material, and the great stability of dyes which it gives. The sawdust from all kinds of wood may be used, but the hard woods are preferred, while the resinous woods are less favorable. The sulphureted sawdust is a soluble product, black, with a slight tint of brown. "It is very soluble in water, and has a tinctorial power *truly extraordinary*, and furnishes hues of remarkable solidity, and at the same time the most delicate tones." This is illustrated by specimens of dyed cotton thread; two colors being shown,—a gray and a very deep, but slightly brownish, black. The authors add: "We think that this product, of such simple preparation, will be of great advantage in dyeing, not only for the solid tints, which it furnishes directly, but as a bottom for other colors."

The method of applying the colors is thus given:—

"There are many methods of fixing our dyes upon fibres. All the agents which precipitate their solutions can be applied for this purpose, but the solidity of the dye is not the same in all cases. The method which we use, and which is very simple, is as follows:—

"It is only necessary to dissolve our products in warm water, in quantities varying according to the intensity of the tint we wish to produce. We call this solution the *coloring bath*. The cotton yarns are immersed in this bath for about half an hour. They are then taken out, and immersed for the same time in a very hot bath of bichromate of potash, which we call the *oxidizing bath*. They are then rinsed in flowing water, and afterwards generally submitted to the action of a boiling solution of carbonate of soda, which removes the bichromate of potash not removed by the washing, and finally consolidates the dye. This last bath we call the *fixing bath*. The dyed materials are then washed in cold water and dried in the open air or in a stove.

"Among the tints obtained by this process there are some whose stability is truly remarkable.

"Besides this method of dyeing by skeins, it is easy to understand that our products can be applied to fabrics in the piece; and their use in printing is a matter of no difficulty.

"Our personal experiments have been made principally upon cotton yarns and fabrics, but we have also applied our products to the dyeing of wool and silk. It is desirable for the latter textile materials, in some cases to add to the *coloring bath* a few drops of a mineral or organic acid, — acetic acid, for example. The dyeing then proceeds as in other cases."

We have not space to follow our authors in their description of the special operation of different materials, especially the naturally colored dyeing products. It may be said, however, that more varied tints are produced by the application of this process to the naturally colored woods and other organic dyeing materials.

The authors conclude this paper in these words: —

"The chemist used to say, 'Give us a pocket-handkerchief, and we will give you sugar.' We can now say, 'Give us a pocket-handkerchief, and we will return you a dyeing product.'

"Up to this time, if we except the artificial products from coal, nature has furnished directly to dyers all the materials which they use. The greater part of these materials are exotic; and Europe, in order to make use of them, must render herself tributary to the countries producing them.

"The method which we point out enables industry in many cases to replace natural by indigenous factitious products, and to do this with advantages of cheapness and solidity of dyes.

"The greater part of our colors have, it must be said, neither the purity nor the brilliancy of the aniline dyes. They generally are of tints more or less achromatized (that is, they do not produce the chromatic or pure colors of the rainbow, but are neutral). Still, with this deficiency, they may be used to essential advantage in many manufactures. Besides, they can be associated with other colors to deepen them, and to give what the dyers call a *bottom*.

"We may observe that among our tints there are some whose remarkable stability can be used to great profit in dyeing fabrics which have to be subjected to frequent washings.

"The fabrication of our products is characterized by *uncommon simplicity*. It requires neither costly material nor special plans for manufacturing; and when we reflect that we obtain these new coloring materials from substances of no value, and by processes of no expense, we are authorized to believe that our discovery will be appreciated by the scientific and industrial world."

This memoir is followed by a report of a committee of five chemists, to which it was submitted by the Society. This report is naturally characterized by the reserve with which conservative science regards all innovations; but it fully admits the correctness of all the facts stated in the memoir. It says, *en resumé*: "The products of Messrs. Croissant and Bretonnière have given us no tint which we have not been able to obtain by other means; but these products present the advantages of the greatest facility of application, and of a remarkable solidity, conjoined with the advantage of a relatively low cost."

The reports which reach us from other European industrial journals show that this discovery is admitted by practical manufacturers to be one of the most marked steps in dyeing in the progress of our time.



OFFICIAL PROCEEDINGS OF THE ASSOCIATION.

ERRORS IN OFFICIAL REPORTS OF WOOL CONSUMPTION CORRECTED.

To the National Association of Wool Manufacturers:—

THE Chairman of your Committee on Statistics published with the last Annual Report of his house, George Wm. Bond & Co., the following table from the Report of the United States Bureau of Statistics, showing the quantity of foreign wool entering into consumption in the United States in the fiscal years 1871, 1872, 1873, and 1874, purporting to be divided according to the United States Revenue Classification:—

QUANTITY OF FOREIGN WOOLS ENTERED FOR CONSUMPTION IN THE FISCAL YEARS

	1871.	1872.	1873.	1874.
Class 1. Value 32 cts. per lb. or less, unwashed	5,348,203	14,733,970	5,011,204	1,264,904
" 1. Value over 32 cts. per lb.	82,494	1,983,186	722,547	1,087,391
" 1. Scoured	3,334	679	3,332	10,024
" 1. Washed	23,430	153,496	292,404	35,893
" 2. Value 32 cts. per lb. or less	17,431,746	35,873,654	43,878,672	25,560,382
" 2. Value over 32 cts. per lb.	223,853	5,280,739	5,693,843	2,000
" 2. Scoured		1,067		
" 3. Value 12 cts. or less per lb.	19,658,743	17,887,464	10,923,361	14,730,863
" 3. Costing over 12 cts. per lb.	6,892,252	18,401,384	17,716,491	12,577,227
	50,164,055	94,315,639	84,241,854	55,268,684

After it was prepared and ready for distribution, he examined it and found that so far as the division into first and second classes is concerned, it was entirely at fault. He immediately entered into correspondence with Mr. Young, the accomplished chief of that Bureau, who sent, as his authority for that report, an abstract of the returns of the Boston and New York custom-houses.

A correspondence with those custom-houses revealed the fact that as their returns were simply for revenue purposes, and as the duties are the same on No. 1 and No. 2, they had neither in New York nor Boston been governed by any particular rule in placing the returns under one head or the other.

In consequence of this correspondence, Mr. Young has added an explanatory note to the table in the Report on Commerce and Navigation for 1874, and has given instructions to the several custom-houses to make the classifications correct hereafter. This is very important, as the enormous amount reported as second-class wool was liable to lead to the suspicion that first-class washed wool had been introduced as second class, to avoid the double duty to which washed wool of the first class is subject.

From the Boston custom-house the returns for the fiscal year 1874 of wools that went into consumption 14,814,329 lbs. second class, and no first class.

We have returns from the appraisers' department of this custom-house, which show that the whole amount of second-class wool imported during the calendar years of 1873 and 1874 was 1,264,163 lbs., and of first class 22,417,417 lbs. The table which we annex gives the imports into Boston as prepared and classified by the appraisers of this port for six years, and is without doubt reliable.

	1869.	1870.	1871.	1872.	1873.	1874.	Total for Six Years.
First Class . .	3,402,487	5,435,767	22,660,433	21,580,712	14,669,470	7,777,947	75,515,816
Second Class . .	3,747,131	2,061,384	2,894,553	1,972,284	1,051,641	212,522	11,939,515
Third Class . .	12,297,576	8,836,238	13,030,797	14,037,875	9,500,915	6,029,629	63,732,930
Waste				152,164	56,687		208,851
Total	19,447,194	16,333,389	38,594,783	37,723,025	25,278,713	14,019,998	151,397,102

This shows that the import of second-class wool for the six years was only 7.22 per cent of the entire importations at this port, where they have undoubtedly formed a larger portion than at any other, outside of the Canadian ports.

Respectfully submitted for the Committee on Statistics, by

GEORGE WM. BOND, *Chairman.*

PERCENTAGE OF WOOL MACHINERY IN OPERATION IN 1874.

To the Government of the National Association of Wool Manufacturers : —

GENTS, — In accordance with the vote passed at the Annual Meeting in October, the Committee on Statistics sent the following Circular to manufacturers, and received returns from 268.

Boston, Oct., 1874.

DEAR SIR, — At the Annual Meeting of the National Association of Wool Manufacturers, held in New York, on the 7th inst., it was voted, —

“That the Committee on Statistics take measures at once to ascertain how much woollen machinery is now running.”

To aid in this will you please to return the enclosed card, filled out with replies to the following questions:—

We have in our Directory recorded the number of sets of cards in your mill, and the number of combers.

What was about the average number of hours per day that your machinery ran during the six months ending Sept. 30, 1874? The questions which we propose are the following:—

What was the average number of hours from that date to Oct. 15?

What is the present average?

What kind of goods are you making?

Please reply promptly, to facilitate an early report on the condition of the woollen manufacture of the country.

All replies will be confidential; the aggregate result only will be made public.

Yours respectfully,

GEORGE WM. BOND,
JAMES ROY,
J. V. BARKER,
E. L. STIMSON,
JOHN T. WARING,
Committee on Statistics.

NOTE. — A mill of 10 sets of cards, if 7 have averaged 8 hours, will average, for the 10, 5 6-10 hours.

The result of these returns is shown in the following table : —

KIND OF GOODS MANUFACTURED.	Number of Mills.	Sets of Cards, equivalent in Combers.	Average hours per day, running from April 1 to Oct. 1, 1874.	Average hours per day, running from Sept. 16 to Oct. 1, 1874.	Average hours per day, running at date of Report, Nov., 1874.
Casimeres	96	866	9.28	8.38	7.10
Beavers and Coatings	14	174	10.94	9.38	8.06
Flannels	27	188	10.27	9.10	8.35
Satinets	5	23	7.70	7.00	7.00
Carpets	5	179	10.42	10.00	10.00
Blankets	10	55	11.82	11.58	11.35
Ladies' Dress Goods	3	67	10.82	10.36	10.00
Repellants and Cloakings	15	106	10.39	10.08	9.70
Yarns	7	122	9.36	8.87	8.63
Knit Goods	19	135	9.80	8.98	7.66
Sundries	67	452	9.31	8.16	8.32
Total	268	2,366			
Average			9.74	8.84	8.13
Not in operation			132	146	143
Average time excluding sets idle			10.30	9.45	8.70

The returns were from 2,026 sets of cards and 96 combers, estimated as together equal in capacity for consuming wool to 2,866 sets of cards. Although these returns are from but a small proportion of the mills in the United States, they may perhaps be safely assumed to represent the average, as they embrace almost every branch of the woollen manufacture, and are from nineteen different States.

Many of these mills return a variety of manufactures, and these we have, where they could not be approximately divided, placed in the line of sundries.

All of which is respectfully submitted.

GEORGE WM. BOND, *Chairman.*

THE COW AND CAMEL HAIR FRAUD EXPOSED.

We are happy to announce that mainly through the influence of Mr. Dawes, who never loses an opportunity to serve our manufacturers, the frauds in the importation of woollen goods alleged to be composed of cow and camel's hair will be stopped. Stimulated by Mr. Dawes's representations, the Treasury Department, which has recently signally proved its interest in guarding our industries, has

thoroughly investigated the character of these importations, and has obtained unequivocal proof that frauds have been for years past perpetrated on the Government, in the importation of goods which the English manufacturers swore were made wholly of camel's or cow's hair, and as such entitled to admission at a duty of 35 per cent, while in fact they were in a very great measure composed of wool, and as such liable to the higher duty imposed on woollen goods. We are informed that the Department has taken effectual measures to stop this fraud.

WHAT IS THE SPECIAL VALUE OF NOILS?

ONE great drawback to the worsted manufacture of this country is the low estimate in which noils are held by manufacturers. In England they bring nearly as much — some grades fully as much — as the scoured wool from which they were combed; while in this country they are not bought readily even at a discount of 25 to 30 per cent from the cost of the wool to the combers; which difference is equivalent to a loss of $7\frac{1}{2}$ to 10 per cent on the raw material used in this branch of manufacture.

At the present time some of the grades are as high as they are in this country, which fact would seem to indicate that our woollen manufacturers have something to learn with regard to their use from the long experience of their foreign competitors, as the raw material from which they are made costs here about 50 per cent more than in England.

Can any of our correspondents explain this, or inform us for what classes of goods they are mostly used in England? They do not by themselves felt so easily as wool, and are therefore valuable for the manufacture of flannels and knit goods. They are said to be largely employed by the broadcloth manufacturers to mix with wool. What is the advantage gained by using them in this way?

Can any one give us the origin of the word "noils"?

List of Publications to be obtained at the Office of the Association.

I.
OBJECTS AND PLAN OF THE NATIONAL ASSOCIATION OF WOOL MANUFACTURERS: its Organization, Articles of Association, and By-laws. 20 pp.

II.
THE FLEECE AND THE LOOM: An Address before the National Association of Wool Manufacturers at the first Annual Meeting in Philadelphia, Sept. 6, 1865. By John L. Hayes, Secretary. With Secretary's Report and Tables. 80 pages. Bound in cloth, \$1.00; in paper, 50 cts.

III.
REPORT OF THE PROCEEDINGS OF THE CONVENTION OF DELEGATES from the National Association of Wool Manufacturers, and from the several Organizations of the Wool-growers of the United States, at Syracuse, N. Y., Dec. 13, 1865. 99 pp.

IV.
JOINT REPORT OF THE EXECUTIVE COMMITTEE of the National Association of Wool Manufacturers, and of the Executive Committee of the National Wool-Growers' Association, addressed to the United States Revenue Commission, Feb. 9, 1866. 23 pp.

V.
STATEMENT OF FACTS RELATIVE TO CANADA WOOLS AND THE MANUFACTURES OF WORSTED. 21 pp.

VI.
THE CARPET MANUFACTURE: A Statement of Facts addressed to the United States Revenue Commission. 9 pp.

VII.
STATEMENT OF THE EXECUTIVE COMMITTEE of the National Association of Wool Manufacturers, relative to Proposed Duties on Wool and Woollens, with explanatory Key, addressed to the United States Revenue Commission, May, 1866. 42 pp.

VIII.
LETTER, EXHIBITING THE CONDITION AND NECESSITIES OF THE KNIT-GOODS MANUFACTURE, addressed to Hon. Justin S. Morrill, Chairman of Committee of Ways and Means, May, 1866. 19 pp.

IX.
"PROTECTION A BOON TO CONSUMERS." An Address by John L. Hayes. 55 pp. Bound in cloth, \$1.00; paper, 50 cts.

X.
THE ANGORA GOAT: Its Origin, Culture, and Products. By John L. Hayes. 38 pp. Bound in cloth, \$1.00; in paper, 50 cts.

XI.
REPORT UPON WOOL AND MANUFACTURES OF WOOL. Paris Universal Exposition, 1867. By E. R. Mudge, U.S. Commissioner, assisted by John L. Hayes. 148 pp. Bound in cloth, \$1.50; in paper, 75 cts.

XII.
BULLETIN OF THE NATIONAL ASSOCIATION OF WOOL MANUFACTURERS. January, 1869. Vol. I., Nos. 1, 2, and 4. Vol. II., Nos. 1, 2, 3, 4, 5, 6, and 7. Vol. III., Nos. 1, 2, 3, and 4. Vol. IV., Nos. 1, 2, 3, and 4. Vol. V., No. 1, and 2.

XIII.
WOOL INDUSTRY OF THE UNITED STATES: An Address delivered at the Exhibition of the American Institute, in the City of New York, Oct. 5, 1869, by Erastus B. Bigelow, President of the National Association of Wool Manufacturers. 22 pp.

XIV.
AN EXPOSITION OF THE PRINCIPLES forming a Basis of the Present Tariff on Manufacture of Wool, and of the Sections relating to Woollens recommended by the Committee of Ways and Means, February, 1870. Reprinted from the "Bulletin of the National Association of Wool Manufacturers," by authority of its Executive Committee. 18 pp.

XV.
THE PROTECTIVE QUESTION ABROAD, and Remarks at the Indianapolis Exposition. 66 pp. Bound in cloth, \$1.00; in paper, 50 cents.

XVI.
THE SOLIDARITY OF THE INDUSTRIES, as illustrated by the Relations of the Woollen Manufacture: An Address delivered at the Fair of the American Institute, New York, October 18, 1870. 23 pp. Bound in cloth, \$1.00; in paper, 25 cents.

XVII.
THE PROTECTIVE QUESTION AT HOME; being the Substance of a report of the Committee on Manufactures submitted to the Fortieth Congress by Hon. D. J. Morrell, of Pennsylvania, with Supplementary Notes. 56 pp. Bound in cloth, \$1.00; in paper, 50 cents.

XVIII.
REVIEW OF ALCAN ON THE MANUFACTURE OF WOOL; being a Supplement to "The Fleece and the Loom." 40 pp. In paper, 50 cents.

XIX.
INTRODUCTION OF THE WOOLLEN MANUFACTURE INTO THE UNITED STATES. By Royal C. Taft. In paper. 12 pp.

XX.
THE WOOLS OF THE UNITED STATES. By John L. Hayes. 47 pp. In paper.

XXI.
SPEECHES, ADDRESSES, AND LETTERS ON INDUSTRIAL AND FINANCIAL QUESTIONS. By William D. Kelley, M. C. 514 pp. In cloth.

XXII.
NOTES UPON INDIGO. By John L. Hayes. 79 pp. Bound in cloth, \$1.00; in paper, 50 cents.

All of the above will be forwarded, without charge, to members of the Association, upon their application to the Secretary.

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Poplin Stripes.

3-4 Printed Plaids.

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6-4 Poplin Alpacas, Colors and Black.

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A largely increased production has been made to meet the pressing demand for
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Jobbers' hands.

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A new Mill of 40,000 spindles has been, during the past year, built and put in
operation, — thus replacing the mills destroyed by fire, — with the latest improve-
ments in machinery. The Cotton Flannels and other goods now on the market
show a decided gain in quality over any heretofore produced.

Saratoga Victory Manufac'ng Company.

PLAIN AND TWILLED SILESAS, ROLLED JACONETS,
COLORED CAMBRICS.

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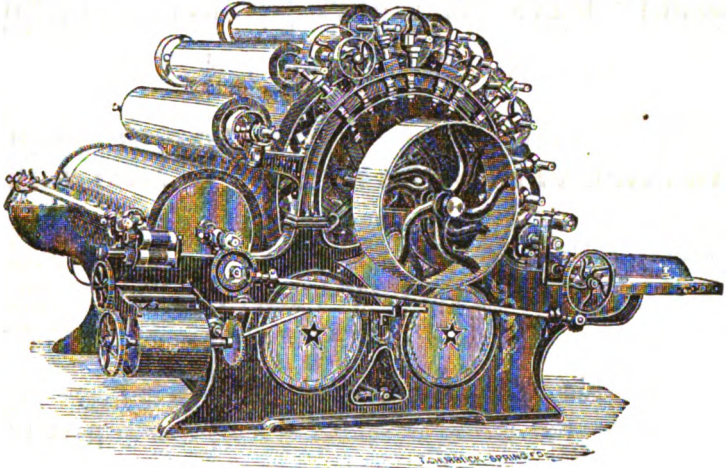
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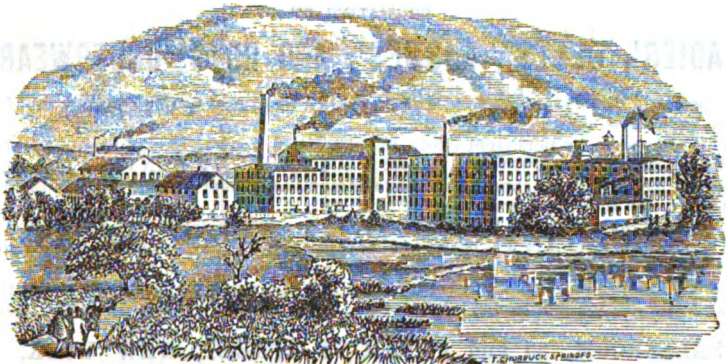


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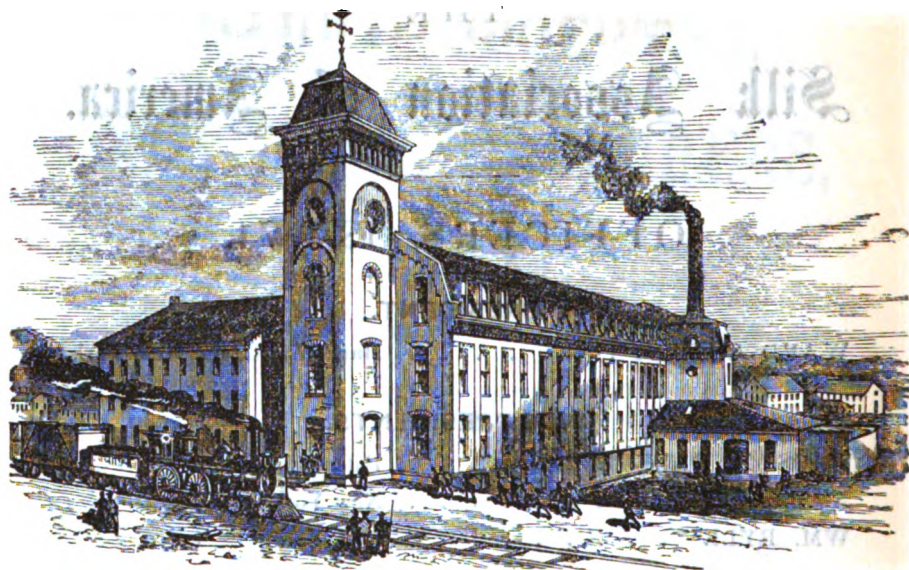
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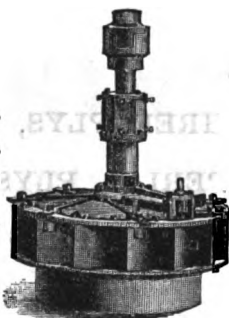
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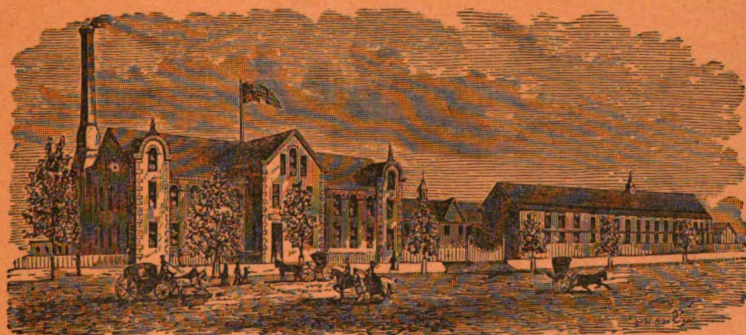
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VOL. V.]

[No. 5.

The Association
BULLETIN

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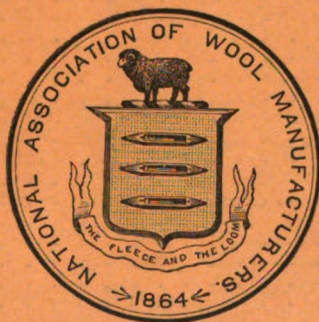
National Association

OF

WOOL MANUFACTURERS.

FOUNDED NOV. 30, 1864.

1875.



EDITED BY JOHN L. HAYES.

BOSTON:

OFFICE, 11 PEMBERTON SQUARE.

1875.

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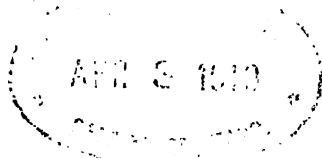
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BULLETIN

OF THE

National Association of Wool Manufacturers.

VOL. V.]

BOSTON, APRIL—JUNE, 1875.

[No. V.]

ALLEGED INFERIORITY OF AMERICAN WOOLLENS.

WE have to thank Mr. Henry C. Carey — always so wide awake to the interests of our manufacturers — for calling our attention to the following article, printed in the "New York Evening Post" of May 5, 1875, and for intimating the propriety of a reply.

THE CURSE OF IMITATION IN MANUFACTURES.

"Hinsdale is very much depressed over the shutting down of the three Plunkett mills, leaving only the Hinsdale factory in operation. Dulness in the woollen market did it." — *Adams (Mass.) Transcript*.

What is the matter with the woollen market? Whence comes this dulness of which the woollen manufacturers have been constantly complaining for these eight years past? Are there not as many people in the United States who wear woollen garments as there ever were? Is there not as much money expended in this country for woollen fabrics as there ever was? If this "dulness in the woollen market" were something new, unusual, peculiar to the present season, it would have to be explained from transient causes, from accidental over-production, a sudden change in the public taste, or something of that sort; but, on the contrary, this depression has extended right along throughout the later years, and the causes of it consequently must be permanent causes.

The proximate cause of the totally unsatisfactory condition of the woollen manufacture in this country is, that the intelligent people of the United States are for the most part too prudent to buy American woollens. They buy as many woollens as ever they did, or more than ever they did, but they buy English, Scotch, German, French, and not American woollens. This is a matter of fact very easily tested. Every man who reads these lines will know for himself whether he wears foreign or domestic cloth; and if, in addition, he will take the trouble to ask his tailor what proportions of the two kinds of cloth he is in the habit of making up, he will be in the way of getting at the facts in the case very intelligibly and certainly. The facts undoubtedly are that a very large and regularly increasing number of the American people are clothed in the products of foreign looms; and this, not because they would not prefer American cloth if they could get it of an equal quality for an equal price, but because they must buy the foreign cloth if they are at all particular about the quality or economy of what they buy. The "dullness in the woollen market" is the reluctance of the people to buy such flimsy, shabby, shoddy goods as most of our woollen factories are throwing into the market. Of course, in saying this, we make allowance also for the enforced economy of many of our people under the general depression of business.

As a rule, the woollen factories in this country are making very poor goods; and the exceptions are not numerous and important enough to redeem the general product from suspicion and contempt. Some cotton is almost universally carded in with the wool, which, in itself considered, does not perhaps harm the fabric very much; but there are all sorts of other devices designed to spare the wool stock, and to give to the piece an apparent body and firmness that do not really belong to it. The use of flocks is very common, as well as of deceptive threads; and the various expedients designed to make the cloth seem to be better than it is, and better than it will be found to be on practical wearing, are too numerous and intricate to mention here. The culmination of all these mean tricks is the attempted imitation, in cheap materials and inferior workmanship, of honest and popular foreign goods. The ingenuity displayed in devising machinery, and in combining all kinds of processes, for copying in a deceptive way foreign goods and styles of goods, would seem to be amply sufficient for the origination of novel and honest grades, and of native and acceptable styles. The great point of our textile manufacturers seems to be not, as it ought to be, to originate something good, to have something of our own which foreigners might well copy, but to copy in a deceitful way something already originated

abroad, to study methods of deterioration, to go down hill, to make believe, to cheat.

Nothing is more praiseworthy than the imitation of a good model, with a desire to equal or surpass the original, unless it be the attempt to originate such a model for others to imitate: but this imitation of a model in order to debase it; this eager study of a sample for the sake of becoming able to make a worse one; this ingenuity perverted to small ends; this unconscious tribute paid to the superiority of foreigners; this depreciation of one's countrymen implied in thinking that any thing is good enough for them; this general lurch towards deception in the warp and woof of industrial action,—is the curse as well as the disgrace of American manufacturers. It is needless, because this country has natural advantages in the way of manufacturing textile fabrics second to no other; it is unprofitable, because people can never be permanently deceived in the quality of the goods they buy, and because an export trade in dishonest goods is impossible, and when a limited and ignorant home market is supplied there is an end; it is discouraging to high-toned manufacturers, because their goods, however excellent, have to meet the wide-spread suspicion engendered by such a false system; and it is demoralizing to the public conscience, because when men see evidences of deceit, and trickery in the very clothes on their backs, they are tempted to say, with the Psalmist, "All men are liars," and to become liars and tricksters themselves.

It is very noticeable that this servile and immoral imitation of foreign fabrics has widened and increased under a false commercial system, whose ostensible purpose is to make us "independent" of foreigners. "Protection," itself an essential fraud, has to answer for much of this fraudulent practice and dwindling independence. Under a system avowedly concocted to give to domestic manufacturers a home market rapidly augmenting, numbers of our countrymen wear no rag of American woollens, but are clad from top to toe in foreign fabrics; under a system that used proudly to vaunt itself as the "American system," American textile manufacturers have justly become a by-word within nations vastly less gifted than America is; under a system foolishly and futilely designed to make us independent of foreigners, some of the most assiduous industries in the country are occupied in servile imitation and deliberate deterioration of foreign industrial masters and models; under a system that professes to foster special industries, some of these very industries have practically ceased to be carried on; under a system that promises cheap manufactures, some of these manufactures have indeed become "cheap" in the sense of being nearly worthless,

and others of them have been so unconscionably burdened and hampered by "protective" taxes on their raw material, on their machinery, on their dyes, on their salt, and on their other supplies, that, succumbing at last, like these old woollen mills in Hinsdale, a newspaper paragraph records in one sentence their demise, and furnishes a truthful epitaph.

When will the American people learn that truth is better than a lie; that nature is wiser than the short-sighted greed of a few individuals; that to be able to buy well requires first something worth selling; that manufactures cannot be fostered by taxing the raw materials, or trying to shut out rival goods; that "protection" by making domestic goods worse in quality, makes the importation of better goods a necessity; that, in short, "protection," in all its works and influences and consequences, is alike injurious to commerce, manufactures, and morals?

verses/ This cruel attack upon American industries is all the more unkindly from the source from which it emanates. The "New York Evening Post" is a paper of acknowledged power in the country. The principal source of this power is the respect in which the American public holds its recognized editor. High above all American editors shines the name of William Cullen Bryant. And why? Because he is the best living exponent of the nationality of American literature. When the question was asked some fifty years ago, who reads an American book, and was answered by the "North American Review," in words which made our blood tingle then, the ~~works~~ of Bryant were the chief proofs of the dawn of independence and power of American literature; and yet Bryant is neither a Shakespeare nor a Burns. But he is American. His themes, his illustrations, his motives, his aspirations, are American. The seed of national sentiment which he has sown, has germinated even in the humble field of industrial labor. Our manufacturers have these aspirations no less than the poet, and would follow his example of freeing themselves from the old-world shackles; and would honor their country by their work, as he has by his verse. How painful, then, is it to see that great name and influence desecrated to the purpose of dishonoring American industry!

Some of the most obnoxious of the allegations in the "Evening Post's" editorial are, as follows :—

That, "a dulness in the woollen market has extended right along for eight years, due to permanent causes."

That, "the proximate cause of the totally unsatisfactory condition of the woollen manufacture in this country is, that the intelligent people of the United States are, for the most part, too prudent to buy American woollens."

That, "they buy English, Scotch, German, French, and *not* American woollens."

That, "a regularly increasing number of the American people are clothed in the products of foreign looms."

That, "the alleged dulness in the woollen market is, the reluctance of our people to buy such flimsy, shabby, shoddy goods, as most of our woollen factories are throwing upon the market."

That, "the woollen factories in this country are making very poor goods."

That, "the great point of our textile manufacturers is to study methods of deterioration, to make believe, to cheat."

That, "American textile manufacturers have become a byword with nations vastly less gifted than America is."

That, "a general lurch towards the warp and woof of industrial action is the curse, as well as disgrace of American manufactures."

That, "protection has to answer for this fraudulent practice."

That, "in short, in all its works and influences and consequences, it is alike injurious to commerce and manufactures."

These charges are not only malignant and false, but they betray such utter ignorance, on the part of the writer, that we should be ashamed to notice them, if their responsibility had not been assumed by the position of the article containing them, as the leading editorial in a respectable journal.

And, first we say, it is not true that "a dulness in the woollen market has extended right along for eight years;" a period evidently taken to correspond with the duration of the wool and woollen tariff of 1867. A dulness of market which has extended for eight years must manifest itself in diminution of production. Now, the fact is, that these eight years have been marked by a production unprecedented in any former period

of the same duration. (The census returns show 10,026 sets of machinery in operation in 1870. The returns made to the association, published in the "United States Textile Directory," of 1875, show 9650 sets of machinery in operation. Skilled manufacturers estimate the increased production per set, owing to improvement in processes and machinery, at from ten to twenty-five per set. Even during the few months succeeding the panic, when there was a general prostration of business, the returns made to the association, from 2366 sets of cards, show but 132 idle, and a reduction of working time of but twenty per cent. Excepting the period of the panic, which has affected every industry alike, the only dulness which the manufacturer has had to complain of, during the greater part of these eight years, is the reduction of price through excessive production. But this excessive product is hardly consistent with the statement, that the intelligent people of the United States are, for the most part, too prudent to buy American woollens.) What has become of the production of these two thousand sets for the last five years? Has it been exported, or burnt up, or thrown into the sea? Our production increased so much in the first five years of the eight, declared to be so dull, namely, the five years succeeding the tariff of 1867, that the imports of woollens during those years was thirty-one per cent less than during the five years which preceded the tariff of 1867. In ten years, of which three of the eight alleged dull years form a part, while our population increased 22.22 per cent, our production of woollens increased 154 per cent, nearly three times as much; and yet, in spite of these facts, the sapient "Evening Post" tells us, that a regularly increasing number of the American people are clothed in the products of foreign looms. We are told to go to our tailors to test the truth of this assertion, "certainly." This is the very last source which we should seek for "certain" information. The tailor knows too well the prejudice against American goods which he is the chief means of fostering for his own interests, to confess that he is in the habit of substituting foreign marks upon American goods. Besides, the tailors furnish but an insignificant part of the clothing of our population. The mass of our

male population is clad by the ready-made clothing manufacturers. The production of wholesale clothing in eight cities alone, is set down on high authority at 76,000,000, and seven-eighths of this clothing is made of American cloth. The clothing manufacture is rapidly increasing and improving. It will always derive its principal raw material from our mills, unless our manufacture is destroyed by free-trade. From this use alone, the relative consumption of American woollens by our people is proceeding in an ascending ratio.

The preference of the clothing manufacturer for American cloths is the most conclusive evidence of their superiority and adaptation, both in excellence and cheapness, to the wants of consumers. Probably three-quarters of the customers of the American mills are the clothing manufacturers. Unlike the customers of the merchant tailor, they are expert judges of cloth. They cannot be imposed upon by flimsy, shabby, shoddy, cotton-mixed, or flock-backed fabrics; and although they may buy cheap goods, they are sure to get their money's worth. The factories make just the goods that these skilled customers want; and that the customers are satisfied is proved by the well-established fact, that they buy seven-eighths of their cloths from American mills.

On the other hand, the declared preference of the merchant tailors and *their* customers is no evidence whatever of the inferiority of American fabrics. The merchant tailor can make more profit on foreign cloths, as he can deceive his customer as to their cost and value. Besides, a large class of the customers of the merchant tailor prefer foreign cloth, mainly for the reason, that the common people wear American fabrics. The constant effort of high fashion is for exclusiveness; so well illustrated by the fact, that, when the importation of cotton stockings was prohibited in France, the ladies of high *ton* abandoned silk stockings for the prohibited cotton.

The charges that our people are reluctant "to buy such flimsy, shabby goods, as most of our woollen factories are throwing into the market," that, as a rule, they are making "very poor goods," that "the general product" is subject to a suspicion and con-

tempt," that our manufactures have "become a by-word" among foreign nations, are so grave as to demand something more than an indignant denial.

In replying, let us first make the admission, that the finest faced goods, such as the German and west of England broad-cloths are largely sought for abroad. That we can make them, is proved by innumerable mills. But they are in very limited demand for dress suits, for which they are chiefly used, and mainly by an exclusive and limited class, who would naturally reject American goods, though equally good. Their fabrication is not a national necessity. Our manufacturers prefer to make the goods which enter into general consumption; and, at present, make up the every-day cloths of all classes. We do not hesitate to declare that these fabrics of American manufacture, in soundness, finish, and freedom from adulteration, are equal to those of any country; and in freedom from false admixtures, and in strength of fibre, are superior to those made abroad, especially by British manufacturers.

Before proceeding to the proof of this assertion, we must call attention to an important difference in the circumstances of manufacture here and abroad. In Europe the system of classifying and sorting wools is carried to such perfection, that the wool market is amply supplied with all the distinct sorts; so that the manufacturer may profitably run his mill entirely upon either the finest or lowest sort. From the want of concentration of wool in our market and other causes, the American manufacturer sorts his own wool, and having it of different grades, must make goods of corresponding grades. He cannot manufacture properly unless he makes low as well as high class fabrics. Thus, the products of a single European mill may be superior to those of any single American mill, while the general fabrics of the European may be inferior to the general American fabrics.

To recur to our proposition of the *equality* of American wools with similar foreign fabrics, this was signally demonstrated at the Exposition, made by the association, at the American Institute in 1869. The equality was freely acknowledged by the New York merchants, and was generously admitted by the

accomplished Secretary of the British legation, Mr. Ford, who addressed a note to Mr. Kingsbury, our Superintendent, expressing his astonishment at the proofs of our attainments in the woollen manufacture. We have a proof on the table before us. A member of our association having purchased, when in England, a suit of a London tailor, the latter on our friend's return solicited by letter a renewal of his patronage, accompanying his letter of solicitation by a package of 125 distinct samples of cloth for selection. These samples are before us. We do not hesitate to say, that in style, taste, texture, and material, these best samples of the London tailor could be surpassed by samples, which could be furnished by the mills of the one town of Rockville, Connecticut.

So confident were our convictions upon this point, that we requested a friend to submit these 125 samples to each of the leading houses dealing in woollen goods in New York. The opinion of these experts is expressed in the following statement:—

The undersigned, dealers in woollen goods in the city of New York, hereby certify that we have examined over one hundred samples of woollen goods alleged to have been sent to a gentleman in Boston, by a London tailor, as samples of English fabrication; and after a careful examination have no hesitation in declaring that these goods as a whole can be fully equalled in texture and fabrication by average samples of American goods to be found in the mercantile houses of New York; and that a series of samples of American goods of an equal number can be easily obtained, surpassing the English samples both in taste and excellence of fabrication.)

Pomeroy & Plummer.
David L. Einstein.
E. R. Mudge, Sawyer, & Co.
Whittemore, Peet, Post, & Co.
Harding, Colby, & Co.
George C. Colburn.
Globe Woollen Co., by W. W.
Coffin, Treasurer.

W. C. Langley & Co.
Thomas & Co.
Home Woollen Co., by Bliss &
Allen, Agents.
Norwalk Mills, Hastings Wool-
len Co.
Chase, Stewart, & Co.
H. J. Libby & Co.

We yesterday saw in the Boston Centennial Procession of the 17th of June, the famous New York Seventh Regiment, the pride of that city of importers. They were clad in new uniforms of West Point gray, and we happened to know that the cloth of these uniforms was made by L. Pomeroy & Sons, who have made cloth for West Point for over fifty years. The beauty, finish, and solidity of the fabric sufficiently explained why the New York regiment, with all the predilection of their city for foreign products, did not send abroad for the cloth of their uniform. Look, as we did also yesterday, at a corps of United States regular soldiers, and mark the substantial fabric and unchangeable blue of their uniforms; or even look at the old soldiers' great-coats, the relics of the surplus of the war of the rebellion, which will last when the animosities of the war are forgotten, and we need not wonder at the official declaration of the Quartermaster-General of the U. S. army, that our soldiers are better clad than any in the world.

To recur again to the Boston, or rather national, festival of the 17th of June. On that occasion the majestic spectacle was presented of a population of 600,000 people; 252,000 were brought by railroads from abroad. There were 50,000 in the procession, and the others were looking on. It was a subject of general remark, that in this vast crowd there could not be seen a single badly dressed man or woman, boy or girl. So vast and so universally well clothed a mass of people was probably never witnessed in any age or country. Now, in the year 1870, our production of woollens was \$154,000,000, and the home value of our import of foreign woollens was but 25,000,000, or one-sixth of our whole consumption. From this it is safe to infer that five-sixths of the woollen fabrics in this vast crowd was of American fabrication, and thus the capacity of the American mills to clothe our people in substantial and comely fabrics was brought palpably before the eye.

Our fabrics are not only equal, but in soundness, wearing qualities, superior to foreign fabrics. England, according to Mr. Behrens, President of the Bradford Board of Trade, consumed in one year, 1864, 79,500,000 lbs. of shoddy in making

woollen goods. Whole counties are engaged in the fabrication of shoddy goods, and some 30,000 operatives, exclusively. Our associate, Mr. Oakes, of New Jersey, tells the story of a friend who visited a large woollen-cloth factory in Dewsbury, the headquarters of the English shoddy manufacture. While he was talking to the proprietor, a cart-man drove into the yard with a bale of wool, and, addressing the proprietor, said, "I have a bale of wool for you, sir." "There must be some mistake," said the proprietor, "there has not been a bale of wool in our yard for ten years." No nation in the world has attained such proficiency in making adulterations, admixtures, imitations, and falsifications, as the English. We make some shoddy goods, but we have not the skill to carry imitation and falsification to the extent which England has. If we see an American imitation of a cheap material of a superior fabric, we may be sure that the imitation is a copy of a British copy, and that our copy, although intrinsically better, will be a poor one in a manufacturing sense, as we have not yet attained the experience and skill to make such cheap goods, or of such low materials, as our English teachers. Our incapacity in this respect is shown in the cow-hair goods introduced here from England, to take the place of sound woollen coatings, which are so excellent in their *inferiority*, that we have utterly failed to imitate them.

The general superiority of the raw material of our woollen fabrics is very clearly established by the well-known letter of Mr. Fernau, addressed to our wool manufacturers. Mr. Fernau is a Belgian manufacturer of great eminence. On his return to Belgium from a visit to this country, he addressed a circular to his American friends, pointing out in a friendly way the faults of our system of making cloths. Mr. Fernau says that the American cloth makers "must be enabled to turn to advantage all wastes and refuses which now, skilfully mixed, play such an important part in lowering the cost of fabrics." He thus clearly implies that the Americans do not make use of the cheapening admixtures to the extent to which they are applied in Europe. The most important statement of his letter, however, is his declaration that the American cloth manufacturers "stick to the

old-fashioned, strong-bodied, long-stapled wools," which are so valuable that they ought to be used for combing purposes, while the cloth makers of Europe use the short Mestiza wools. The American manufacturers refuse to use these wools because they are weak and burry. They will not make the substantial fabrics required by popular taste.

It is the fact of the general use of this superior fibre, which justifies us in making the assertion that there are no medium woollen goods, such as the ordinary cassimeres, flannels, and over-coatings, constituting the great bulk of consumption, which in wearing qualities will compare with American fabrics.

This assertion is sustained by the system of manufacture through which our vast interior is supplied. A limited supply of low or shoddy goods is undoubtedly thrown upon the New York market by the Eastern mills. But the mills of the East form a comparatively small source of supply of the woollen goods for our population. It must be remembered that all the States of the West and North-west, and the Pacific, are filled with woollen mills. The mills of California set the example of making a class of blankets, such as never had been before seen. Their example was followed by Minnesota, which supplies with blankets the palace cars of England. Let us look at the State of Ohio as illustrative of the way in which the population of our interior is supplied with woollen goods.

In the State of Ohio, — we take our facts from our "Textile Directory," — there are in present operation 246 sets of woollen machinery, distributed among 136 mills, and these mills are distributed among 57 counties of that State. The mills, therefore, are small, averaging about two sets. It is evident from this broad distribution, that each mill makes the cloth for the surrounding population; the wool which is grown so extensively in Ohio being exchanged for the cloth. Now it is utterly preposterous to assume that shoddy, cotton, flocks, or low foreign wool, enter into the manufacture of the cloth which these mills make. It would not pay, and besides would be found out. So that it is safe to say, that, so far as the production of these 246 sets will extend, the population of Ohio is.

clothed in cloth made of "old-fashioned, strong-bodied, long-stapled wools," wool so valuable that Mr. Fernau says it ought to be all used for combing purposes. Now what is true of Ohio is true of every State of the North-west.

If, as the "Evening Post" alleges, "protection" is responsible for the condition of the American wool manufacture, and that, instead of falsification, excellence is the characteristic of our manufacture, protection is to be credited with this excellence. This we believe to be true. There is no security against fraud like dependence upon home manufacture, if the principal aim of that manufacture is the domestic supply. When the consumer and producer are brought together, there is an immediate responsibility imposed upon the producer. The defects in falsifications in manufacture are immediately traced to the party in fault. The reclamations of buyers quickly bring back the manufacturers' "sins to roost." It is this test which frees the general manufacturing products of our country from the falsifications so common in British goods. No hardware manufacturer of this country dares to supply the American market with such ware as used to come from Birmingham; which, from its inferiority, received the contemptuous name of *Brummagen*. Our silk goods are commanding our market, because they are not weighted with drugs like the silks of Switzerland. The tests made by the Chamber of Commerce, of Shanghai, China, show that while American cotton drillings show a loss of weight by washing of but from $3\frac{1}{2}$ to 5 per cent, the average loss on British drillings is $34\frac{1}{2}$ per cent, this $34\frac{1}{2}$ per cent consisting of sizing, introduced fraudulently to give apparent weight to the goods.

Our assumption that the chief security against frauds is dependence upon the *home* manufacture, is illustrated by a statement which we find in the last issue of the "London Statistical Journal," more fully detailed in this number, to the effect that the most prosperous industry in India at the present time is the cotton manufacture, which is encouraged by a duty on cotton cloths, and that the preference of the Indian population for their own goods is due to their intrinsic excellence as compared with the fraudulent fabrics of Manchester.

The fraudulent practices in the English cotton manufacture, so freely admitted by a high English authority, have more than their counterpart in the English woollen manufacture, and that our market is not inundated by English shoddy goods, is due to the specific duty of fifty cents per pound, so bitterly denounced by free-traders, which is nearly effectual in its prohibition of the British woollen frauds. And thus the protection given by our tariff to our woollen manufactures has been in the strictest sense a *protection* to American consumers.

DYNAMOMETER FOR MEASURING STEAM OR WATER POWER.

CAMBRIDGE, December, 1873.

DEAR SIR, — In putting my Dynamometer into your hands, for the Massachusetts Institute of Technology, it may be proper for me to give you some account of it; and I therefore submit the following particulars, mostly compiled from the notices it received from different publications when it was first exhibited.

Very respectfully and truly, yours,

SAMUEL BATCHELDER.

JOHN D. RUNKLE, Esq., *President of the Institute of Technology.*

I first put my design for the Dynamometer in operation in 1836 or 1837, at the mills of the York Company, at Saco. At the Mechanics' Fair, in Portland, in 1838, it was exhibited, and a silver medal awarded; and it was likewise exhibited at the Mechanics' Fair in Boston, in 1839, where a silver medal was likewise awarded. The "North American Review" for January, 1840, contains an article relating to the second exhibition of the Massachusetts Charitable Mechanic Association at Quincy Hall, in the city of Boston, September 23, 1839. From which the following is an extract: —

"Among the inventions deserving of particular notice, was a Dynamometer, for the measuring of steam or water power, by

S. Batchelder, Esq., of Saco. This is an instrument which has long been a desideratum in practical mechanics. It is on a principle entirely novel, yet so simple, that it is no sooner seen than it is acknowledged to be fully adapted to its object. It may be made of any dimensions or strength suited to the degree of power to be measured; and by merely placing it in the line of communication, by means of a band or gearing, between the water-wheel, or drum of the steam-engine, and the machinery to be moved, the power exerted on the machinery may be exactly measured, by means of a steelyard and weight, which form a part of the machine. There is also connected with it an index, to show the number of revolutions of the drum, in a given time, which being observed, together with the weight, the data are obtained for computing the number of pounds which would be raised one foot high per minute, by the degree of power exerted at the time upon the machine, and transmitted through it to the working machinery. Whether we regard the utility, the ingenuity, or the simplicity of this machine, it must be ranked in a high class of inventions, as rendering that easy of attainment, which was before impracticable by any process universally applicable; and we are a little surprised, that, in the liberal number of premiums awarded, no higher testimonial of approbation has been bestowed upon it, than the award of a *silver medal*."

There was also a similar notice in the "Monthly Chronicle" for November, 1840, with a wood-cut, and description of the machine.

In 1840, a work was published in Glasgow, on the comparative operations in the cotton manufacture in this country and Great Britain. This work was written by James Montgomery, who was then in my employ at Saco. A description of the Dynamometer was given in this work, with an engraving.

A German scientific periodical (Dingler's "Polytechnic Journal," volume 84), contains a very extended article on the subject of Dynamometers, in which a great variety of such instruments are described and engraved, including this, which is there denominated Batchelder's Dynamometer.

The following are extracts from a translation of that article:—

"Description, theory, and directions for using Batchelder's Dynamometer.

"Taken from the 'Proceedings of the Society for the Promotion of Industry in Russia,' 1843, page 216, with drawings and plate.

"The valuable work of James Montgomery lately published, entitled, 'The Cotton Manufacture of the United States of America, contrasted and compared with that of Great Britain, 1840,' contains the drawing and description of a Dynamometer which has been constructed by Samuel Batchelder, agent of the York Company at Saco, in the State of Maine, after the principle of the *differential box*, and which has been particularly used for ascertaining the power required for driving the different machines in cotton mills. This article explains perfectly the construction and application of the instrument.

"The collection of models at the Royal Polytechnic Institute at Berlin contains this instrument complete, which has been built by a former pupil of the institute. This instrument, so completed, is simple and easy to operate, and is preferable to any other known apparatus for ascertaining comparatively small powers. The size and strength here given will make the instrument sufficiently strong for two-horse powers.

"In the following we will first give a description of the instrument, and hereafter its principles, and finally the directions for using it.

"Description, — The Dynamometer, with all the parts pertaining to it, is shown in figure 46; the side elevation in figure 47; front elevation, figure 48; the plan, figure 49, and the vertical cross section. The figures 50 and 51 contains details; the counting apparatus is shown in figures 52, 53, and 54, and is to be found in the collection of models at the Royal Polytechnic Institute at Berlin, and has been built by a former pupil of said institute, in the manufactory at Sallenu, under the direction of Mr. Mohr, in Möllersdorf, near Vienna."

From the above reference to the engravings and models, it appears that great care was taken to go into all the details of construction, and the directions for using are equally elaborate,

and in explanation of the principle they go into a very intricate series of algebraic calculations. In this particular they have been led into an error by the description of Mr. Montgomery, who says the machine is constructed on the principle of the *differential box*. He was led into this error by the outward resemblance of the system of four level wheels working together, to the construction of the *differential box*, without being aware that this term designates a particular movement, which has been applied to the construction of an Orrery, as given in the "Bulletin de la Société pour l'Encouragement de l'Industrie Nationale, 1823." In such an instrument the number of teeth in the driving and the driven wheels is unequal, and in consequence the velocities are different; thus, if the driving wheel has 101 teeth, and the driven wheel 100 teeth, 100 revolutions of the former will cause 101 revolutions of the latter. In my Dynamometer the *differential* system is not used. The number of teeth in each of the four wheels forming the box is the same, and the revolutions of all the wheels is performed in the same time. The action of the two intermediate wheels (of which only one would be necessary) is simply to give motion to the opposite wheel, connected with the machinery to be driven, and the shaft of these intermediate wheels, being connected with the balance or steelyard, shows the power transmitted, as the force required to hold this shaft horizontally in its place is equal to the power expended in driving the machinery that is to be tested. But it should be kept in mind that this shaft, acting as a fulcrum for the intermediate wheels, sustains, like a lever, on one side the power received from the main drum, and on the other side the power communicated to the machinery; therefore, the weight upon the steelyard would indicate double the power used.

The following article from the journal of the Franklin Institute for 1843, contains the best and most intelligible account of the instrument and its operation that has been published:—

DYNAMOMETER FOR MEASURING STEAM OR WATER POWER.

In your journal for May, I find an article from the "Edinburgh New Philosophical Journal," dated from Manchester,

"On the method of registering the force actually transmitted through a driving belt, by Edward Lang, Esq., Professor of Civil Engineering, College, Manchester."

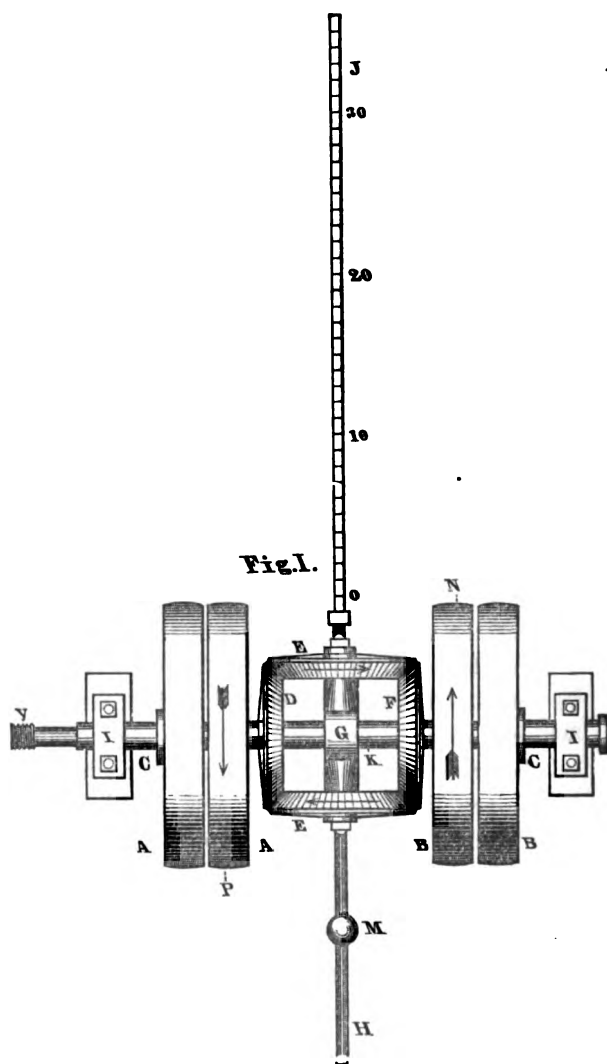
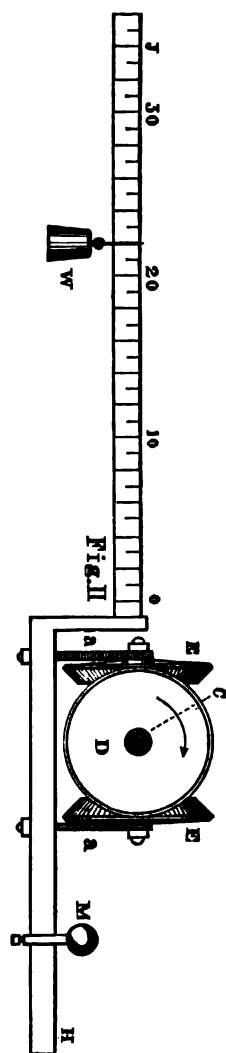
The method proposed is founded upon the extension, or stretch of the belt, by the force communicated through it. That is, that the working side of the belt will be more extended than the slack side; and, consequently, the pulley on the machine will not revolve through so many inches, in a given time, as the drum that communicates the motion; or, in other words, suppose the working side of a belt may be extended one, two, or three inches in an hundred, more than the slack side, it will, of course, lap round the driving drum, in that extended state, while the opposite side is received upon the driven pulley in the slack state, and will communicate so much less motion; and as the difference between the motion communicated to the pulley, and that of the drum, will bear a certain proportion to the strain on the belt in each individual instance, the author says: "We have only to contrive some method of registering this difference, in order to have a record of the total force transmitted by the belt." He then proceeds to a practical application of the principle, and proposes a plan for indicating the difference between the motion of the drums and the pulley, and also experiments with a particular belt, to ascertain what *force* a certain difference in these motions would indicate. He then says: "When the multiplier for one belt has been ascertained, that for any other belt may be approximately computed, if it be of the same material, by having regard to the relative weight of a foot of each," &c.

The reason of my calling your attention to this article, is that the proposal of so imperfect and complicated a plan, shows the want of a good Dynamometer for this purpose, and that neither the writer of the article, a professor of civil engineering in the college of Manchester, nor the editor of the "Philosophical Journal" at Edinburgh (though both might be supposed to be well informed on such matters), were acquainted with a very simple and accurate instrument constructed for the purpose in this country, to which I am about to call your attention, as

described in an article in the "Monthly Chronicle," published in Boston, November, 1840.

At the Mechanics' Fair in Boston, in September, 1839, an ingenious and valuable machine was exhibited, the purpose of which is to obtain an accurate measurement of the degree of power, exerted at any time, in the movement of machinery, while in regular operation. It is the invention of Samuel Batchelder, Esq., of Saco, the Agent of the York Cotton Factory. It is on a principle, which, we believe, is entirely novel, yet simple, and manifestly applicable to the accurate attainment of its object. In applying it to use, in any particular case, it is only necessary to place it in the line of communication, between the engine and the machinery to be moved, by means of belts or gearing. When it is so placed, forming a line of connection between the moving power, and the machinery to be moved, the degree of force exerted in overcoming the resistance of the motion of the machinery, at any given time, is accurately measured, by means of a steelyard bar and weight. The position of the weight on the graduated bar, required for keeping this bar balanced in a horizontal position, indicates the measure, in pounds, of the power exerted at the time. There is connected with the machine an index, to show the number of revolutions of the drum connected with the water-wheel, or steam-engine, in a given time, by which, together with the weight, or resistance to the motion, it will be readily shown how many pounds would be raised a foot high per minute, or in any other space of time, by the degree of power then exerted. The form of the machine is illustrated by the accompanying drawings.

The cuts, figures 1 and 2, give a view of the Dynamometer, in which AA and BB denote two pair of belt pulleys, each pair consisting of a fast and loose pulley. The operation of the machine is to receive the motion or power from the drum, or prime mover, by a belt upon the pulley A, and to transmit it to the machine, which is the subject of experiment, by a belt on the pulley B. The first pulley A, and the bevel wheel D, are fast upon the shaft CC, which revolves in the bearings, II. The bevel wheel F is connected with the pulley B, by a tube



or hub, K, through which passes the shaft CC, upon which this pulley and wheel are supported, the shaft revolving freely in the tube or hub. In order to give motion to the pulley B, a connection must be formed between the bevel wheels D and F; for this purpose they are geared together by the bevel wheels EE, which run upon a cross shaft, through which the main shaft passes freely, at G. Now, it is evident, that if this cross shaft is not held in its place by some force, the motion of the bevel wheel D will only cause the shaft to move round and round upon the shaft C, and the wheels EE rolling upon the wheel F, without communicating to it, or to the pulley B, any motion; but if the wheels EE and the shaft C are held in place, the motion of the pulley A will be communicated to the pulley B, through the bevel wheels, and the force there applied to retain the shaft G and the wheels EE in place, will indicate the power transmitted through the Dynamometer. This power is ascertained by means of a graduated beam, like that on a common balance or steelyard, as represented by HJ, attached to the shaft of the wheels EE, as represented in figure 2 by the straps a, a.

The weight M, fastened by a set screw, affords the means of balancing the lever horizontally, when the machine is at rest; and a weight W, like that of the common balance, moved upon the graduated arm of the lever, will indicate the strain upon the belt. The number of pounds thus indicated, multiplied by the number of feet through which the belt moves per minute, will give the number of pounds raised one foot high per minute, according to the usual manner of estimating the power of steam-engines or other prime movers, allowing 33,000 pounds raised one foot high per minute to the horse power. A worm Y, on the end of the shaft CC, is made to move an index, which shows the number of feet through which the belt, or the surface of the pulley, moves in a given time.

In graduating the arm of the balance J, the division, marked 0 (zero), is at the same distance from the centre of the shaft C, with the surface of the pulleys, or equal to the radius of the pulley. The same additional distance is marked 10, and again the same 20. Now, if we suppose a power of 10 pounds applied

to the pulley at P, it will balance the same weight on the opposite pulley at N ; but it ought to be kept in mind, that it will require a weight of 20 pounds at 10, to balance and keep in place the arm of the lever ; for, as the pivot of the wheel E acts as a fulcrum, it must not only sustain the power exerted by the wheel D, but the power communicated to the wheel F, so that a counterbalance of 20 pounds must be used to correspond with the numbers, 10, 20, 30, upon the graduated arm of the lever.

The plunger attached to the steelyard, and operating in the water box, was applied by Mr. James B. Francis, of Lowell, for the purpose of preventing the sudden vibration, when the instrument was used in connection with any machinery where the strain was very unequal at different times.

BRITISH SHEEP FARMING.

WE have before us an unpretending volume of 125 duodecimo pages with the above title, written by William Brown, factor and estate agent, of Scotland, published at Edinburgh in 1870. The volume is interesting as containing the latest views of British sheep-farming. The writer is evidently a practical as well as a well-educated man. The work has the common objection in technical works of implying a knowledge of many details on the part of the reader, and disappoints us in the parts where we expect the most, — as in the chapters on the management of sheep peculiar to different districts. We have read the book with care, and think the extracts which we give below contain nearly all that will interest our readers.

The author first notices the extraordinary fact that two-thirds, or 77,000,000, of the equilateral triangle of some 500 miles on a side, known as the British Isles, are fields of gold to the British flock-master in wool and mutton. This is due to certain general physical characteristics, and first to the geological constitution of the country.

"As rocks," says Mr. Brown, "make soil primarily, and their position and chemical nature give distinctive character to vegetation, it is evident that the geological nature of a country must materially affect even its surface value, and that in no respect so much as in regard to the grasses. The prevailing groups requiring notice are the limestone, sandstone, and granite, and these three in a great measure regulate the soils of the British Isles. . . .

"First we have the limestone (and chalk) of the south and north of England and centre of Ireland, producing its loamy, light, and absorbent soil in rounded hills; then sandstone in the middle of England and south of Scotland and Ireland, with stiff retentive soils, either of local or foreign origin, on plains and terraces; and the granitic rocks in the north of Scotland, Ireland, and Wales, with soils of a thin cold nature, on broad and peaky mountains."

The observation of the effect of the geological structure on the distribution of sheep is by no means new. A few evenings since Professor Shaler, the able geologist of Harvard University, and State geologist of Kentucky, observed to us, that the geological map of England is an accurate map of the distribution of British sheep; and that his observation in Kentucky — one of the most promising of our own sheep regions — had shown him that the capacity of Kentucky for sheep husbandry is strictly limited by the geological features of the State.

An equally important element of successful sheep husbandry is the rainfall. This the author regards as a question of the highest importance to the grazier in choosing ground for sheep, and even for particular classes of them, as grass of all vegetation, and on special soils, is soonest affected by drought on the one hand, and abundance of rain on the other. There is no connection between registration of a large annual rainfall and a humid climate. Some of the most arid parts of the world can show the greatest amount of rainfall, but this fall is generally comprised within a very short period of the year, and often does more mischief than good. "It is," says our author, "the regularly distributed rain — the fine weekly or bi-weekly showers — that the grazier can alone build upon success in raising wool and mutton."

We have never before seen any facts as to the actual pasturing

capacity of Great Britain. The author classifies the grazings of Britain as cultivated, reclaimed, and natural. By cultivated pasture he means that portion of arable directly in connection with the rotation of cropping, and which is, therefore, seldom more than three years' old; by reclaimed or permanent pasture he indicates that which was once arable under rotation, and that also which has been purposely improved, both being now laid under what is usually called "*permanent*" grass, as well as natural pasture which has received little or no attention at the hands of man.

Adopting this classification he gives a tabular statement of the distribution of the prevalent kinds of sheep in the several counties of the British Isles, the figures being the average of the Government statistics for 1867 and 1868.

We have not space for the county returns, but copy the following abstract:—

ABSTRACT.

	Cultivated Average.		Reclaimed and Permanent Pasturage.	Unreclaimed Lands.	Total Area.	Total number of Sheep.
	Crops.	Grass.				
England .	18,086,000	2,400,000	10,607,000	6,497,397	32,590,397	20,825,000
Wales . .	748,000	815,000	1,894,000	2,282,486	4,734,486	2,439,000
Scotland .	2,070,000	1,285,000	1,006,000	15,828,377	19,639,377	6,982,000
Ireland .	3,823,000	1,658,000	10,062,000	4,776,924	20,819,924	4,836,000
	19,722,000	5,608,000	23,069,000	28,885,184	77,284,184	34,532,000

As a note to this abstract we add from our author the following:—

"Almost one-half of England is under cultivation, one-third is reclaimed pasture, and one-fifth consists of unreclaimed lands. Only one-fourth of Wales is cultivated,—one-third being unreclaimed grass, and one-half unreclaimed lands. Scotland has one-sixth part under cultivation, about five per cent being unreclaimed pasture, and no less than eighty per cent is unreclaimed. There is, therefore, only one-third of the British Isles under arable cult-

ure, more than one-third unreclaimed, and the remaining third is pasture lands."

The reader of Youatt, whose remarkable work on British sheep has had the effect of debarring any author equally competent from showing the present condition of British sheep husbandry, is liable to exaggerate the variety of the present races, and to give importance to distinctions which are not now practically recognized. The fact is, that the tendency of modern times has been to obliterate the old distinctions. It is, therefore, instructive to follow closely this the most recent writer upon British sheep. He says:—

"It is quite possible to make a volume solely on the points of the sheep of Great Britain and their crosses. A careful consideration has, however, led me to select four kinds as the leading and typical breeds of these islands: the Leicesters, Downs, Cheviots, and Blackfaced or Highland; these we find will also represent amply the various *habitats* of the country.

"1. *The Leicester.*

"This is the type of the long-woolled and Lowland breeds, which, in the Lowlands, have now no rival for weight and early returns. It is very docile, not hardy, nor so prolific as some other breeds. The fleece weighs about seven pounds, and the carcass eighty pounds on an average. The mutton is second-rate, and when over two years, is less profitable by accumulation of fat. The most important varieties are Lincolns, Teeswaters, and partly the Cotswolds,—all coarser, yet, in some points, almost equal to their type. A valuable cross of the Leicester with the Cheviot ewe is well adapted to some parts of Scotland, of which those on the Ochils are good examples. The main value of this sheep lies in its crossing abilities with almost all other kinds; and in this respect alone it has made changes and improvements that are almost wonderful. There is not a county in the British Isles, and perhaps not a civilized country in the world, where the Leicester, or traces of his blood, cannot be found. It enjoys rich moist pastures, where there is quantity in small space. It does not, perhaps, actually consume more food than the Down, for example; but, owing to its quiet, ruminating habits, little supports it, and much goes to fat.

"2. *The Down.*

"This is usually classed by the old distinctions, with the short-woolled, though it is now more properly a middle-woolled breed, in consequence of improvements. The flesh is finely grained and well-flavored; indeed, epicures consider it second to none; and certainly it is to England what the Black-faced is to Scotland. The wool is short, close, curled, and fine, and free from spiry projecting fibres. The Down now comes to as early maturity as the Leicester, and is well known for endurance of hard stocking and patience under occasional short keep. Though polled, there is little doubt of their origin having been horned, and probably also black-woolled, as the present black hue of the head and legs, and the occasional appearance of entirely black lambs and small short horns in males, sufficiently indicate their wild ancestry. They may be taken as the type of the Midland grounds of Britain. The average weight of the wether varies from sixty-five to ninety pounds, and the fleece four pounds. The principal varieties are the Hampshire and Shropshire Downs; the latter being recognized now as a distinct breed. Both are stronger and coarser than the high-bred type as above described. A cross with the Cotswold ewe is in high repute in England.

"3. *The Cheviot.*

"These are now the representatives of the lower mountains, yet in parts disputed by the Black-faced. The fleece averaging three pounds, is of medium length, close-set, and fine; and the carcass averages sixty pounds. The flesh is fine-grained, and about equal to the Black-faced. The wool is inferior to that of the Down, and not so fine since the introduction of the Leicester blood. Generally the Cheviot is a hardy and well-balanced sheep, with good walking powers.

"4. *The Black-faced, or Highland.*

"We are now on the top of the mountains, among a race of sheep, the present type of which has arisen from a judicious selection and not crossing. The wool is open, long, coarse, and shaggy. The carcass is invariably short, round, and firm, but narrow on the back; average weight sixty pounds. There has been no really good cross between this and any other sheep.

"GENERAL REMARKS.

"The Leicester takes the first place as a rent-producer. Its remarkable precocity,—no doubt a kind of prematurity arising from its being so much artificial,—its fattening at one year, and reaching full growth when two years old, give it a position to which none of its neighbors can approach. It has no more bone than is necessary for its support, and, though the mutton is not so much esteemed as others, its weight gives value for other purposes.

"The Downs are remarkable for health, which arises partly from their mode of management, and partly from the nature of their habits. Whenever the lowland soil is not rich enough for the Leicester, the Downs find both summer and winter pasture. It does not require a long acquaintance with the Leicester to note the thorough submission of itself to man's will; all sheep are so in some measure, but the Dishly Pet is pre-eminently so. Give it a little to eat often, under easy circumstances, and you may make a daily footstool of it, without any training to companionship. It has been made for the country and not the country for it. The other three have, however, picked out their own particular walks, from which they will not change, unless they are *changed* by much intermixture of blood. It is quite possible to bring even the mountain breed to prefer the Leicester lands, by a simple, though attentive crossing and recrossing, stage by stage, down through the Cheviot (and it may be the Downs) into a 'Leicester one-fifth Blackfaced;' or rather, perhaps, a 'Blackfaced four-parts Leicester.' The mountain sheep is not lost in this. Leave it and its fellows to their own freedom for a few years, and the original type will soon reappear. There is hardly one point of resemblance betwixt the Leicester and Blackfaced; the one is purely of man's modelling, while the other has had no handling except careful selection among themselves; the one must have its food, and a lot of it taken to it, the other will search for it anywhere, and live for days on a handful. There is as much difference betwixt these sheep as there is between hot-house and hardy plants: they are the extremes of this country. The Down is, perhaps, the medium in these respects; the tinge of their origin which still adheres to them gives a hardiness that would otherwise be remarkable for the choice of *habitat*, and yet they are quiet feeders and good stayers at home. The Cheviot is certainly the most convenient sheep as, apart from special economy, he will thrive anywhere on much or on little, in mountain storm or by dreamy mansion [*sic*].

To be everybody's dog is a bad reputation for a dog, but quite otherwise with the sheep, and it is unquestionably the fact, that the Cheviot has the best *general* mutton and wool.

"The names of sheep according to age are not dated from birth, but from *clipping*. By this method the first '*shear*' includes about fifteen months, so that in speaking of a two-year-old, it is really three months more. The following will be found generally applicable :—

MALE.	FEMALE.
1. Tup lamb, till weaned.	1. Ewe lamb.
2. Tup hog, or wether hog, if castrated, from weaning till first shearing.	2. Ewe hog.
3. Tup, shearing-tup, or shearing wether, from first to second clip.	3. Gimmer.
4. Two-shear ram, and two-year-old wether, from second till third clip, and so on.	4. Ewe, if in lamb, barren gimmer if not; and if not put to the tup is a yeld gimmer.

- "A tup or ewe three times shorn is a three-shear tup or ewe, and a wether continues a wether; after that they are aged. An ewe failing to bear a second lamb is a barren ewe; and after ceasing to give milk an ewe is called a yeld ewe. When taken from the breeding flock she is a *draft-ewe*, and the gimmers *draft-gimmers*; and *draft* is applied to others as occasion requires. The names in England, and indeed in localities of both Scotland and it, are a little different, but those above given should be understood anywhere."

The important part which wool and mutton play in the national resources of Great Britain is well illustrated in the following passages. It is a startling fact, and well worthy of being fixed in the memory, that Great Britain realizes from her wool and mutton alone £30,000,000 a year.

"Not only in quality and variety, but proportionately to any other country in the world, Britain feeds the largest number of sheep. Irrespective of adaptability of physical characteristics, the mere fact that of all animals this is the easiest fed, gives, perhaps, the largest returns in the shortest time, and is a first-class fertilizer of the soil, is sufficient reason for such a prominence.

Another cause, though a secondary one, it may be to the purse, is John Bull's respect for his own table. The last ten years even has added immensely to the importance of this production, as wool has risen above one hundred per cent, and mutton fifty per cent in value. And, first, as to the wool: the 34,532,000 sheep of Britain may be thus classed:—

Leicesters, and their allies	12,938,000
Downs " " "	6,180,000
Cheviots " " "	4,868,000
Blackfaced " " "	5,101,000
Welsh	2,000,000
Irish	4,000,000
	34,532,000

Leaving out of account exportation, importation, ages, and any other influences on the number of sheep annually clipped in Britain, we shall take, for the sake of plainness, and as the most likely to be correct, the exact number and proportion thus classified in our calculation of the quantity of wool:—

Leicesters	12,938,000 fleeces	at 7 lbs. each	90,581,000
Downs	6,180,000 "	at 4 " "	24,520,000
Cheviots	4,868,000 "	at 8 " "	13,104,000
Blackfaced	5,101,000 "	at 2½ " "	14,027,750
Welsh and Irish	6,000,000 "	averaging 2 " "	12,000,000
Total number of pounds			154,182,750

It would serve little purpose to attempt determining with absolute accuracy the value of these 154,000,000 pounds of wool, as the price varies almost every season; but, taking an average of 10*d.* per pound, we have the handsome annual return of £6,425,000 from this source alone. The average price of South Down wool for the last fifteen years has been 1*s.* 4*d.* per pound. The average weight of the British fleece may then, from this table, be set down at four pounds. Wool is very much a cultivated article, not only as respects the conditions under which the sheep is brought up, but also as to its being regularly *cropped*.

"Clipping preserves its quality; as when the fleece is left to nature for a length of time, its fine quality disappears, and a good deal of hair comes up. The degree to which this takes place is, however, much influenced by climate. In every fleece there are

several qualities of wool. In the Blackfaced not more than three; four in the Cheviot; five in the Leicester; and not less than seven or eight in the Downs. Of course each kind of fleece has to be 'sorted' to these extents respectively before manufacture.

"If we are correct in assuming that a little under three years is the average age of the various sheep, it follows that about one-third, or 11,510,000, of the whole number must be killed annually; and, taking an average carcass at 65 pounds, we have 748,150,000 pounds as Britain's slaughter of her own mutton. This at about 8*d.* per pound, makes £25,000,000 of annual value. It is no unimportant produce of a country that realizes above £30,000,000 a year."

The author devotes some fifty pages to the peculiarities of district and class management of sheep. We shall not attempt to follow him, but will merely note without order some of the facts which struck us. In Cornwall "the wool is seldom washed on the sheep's back, and is generally sold in the yolk." In the region of the Cotswold hills "some fatten their sheep in covered pens, and even tie them up like cattle."

The variety of food is illustrated by the general sheep management in Oxfordshire. "Many lambs are fattened and sold at fifteen months without cake or corn, and this by attention to regularity and change of food. From January to April they have cut turnips, then mangold, rye, trifolium, and vetches, and in June vetches and trifolium. July and August provide clover and vetches; and September and part of October finish up with clover, rape, and turnips."

The question is often asked, How many sheep may be grown to the acre. In Leicestershire there are 514,000 acres, consisting of 177,000 cultivated, 274,000 reclaimed or permanent pasture, and 63,000 acres unreclaimed. There are in the county 466,000 sheep, or nearly one to the acre "overhead." In Sussex, the nursery of the Down sheep, we find an area of 37,000 acres, carrying 580,000 sheep; one-third of the surface is still unreclaimed, and about one-fourth in permanent and reclaimed pasture. In Northumberland, the home of the Cheviot sheep, there are 1,250,000 acres, one-half improved and this half about equally divided between cultivated lands and permanent

pasture. "Overhead there is, despite the great extent of unreclaimed, one sheep to every $1\frac{1}{4}$ acre." "On the chalk hills of Dorsetshire, it is considered that every acre should keep a breeding ewe."

The author refers only incidentally to the value of sheep for manure. But this consideration evidently is very important in the Down sheep husbandry of Dorsetshire and Sussex. The peculiar practice of folding prevails in those counties. "The ewes are fed in summer on the hill grass during the day, and at night are folded on the arable without food. Of course by this system of manuring, the farmer keeps as many sheep as possible, and often more than is desirable." "In Sussex the value of such manure (that obtained by folding) is set down at one-fourth of the value of the sheep." In connection with the subject of manure, it is worth noting that the pastures of the county of Chester — a cheese district — are kept up with *bone dust*.

The two most important general facts impressed upon our mind by Mr. Brown's sketch of the different sheep districts of Great Britain are, that grazing forms the principal nourishment of the sheep, and is a more important consideration in English sheep husbandry than is generally supposed in this country, and, secondly, that turnips, although a secondary food, seem indispensable for winter nourishment, and as a grounder for fattening for the butcher. That good grazing is held to be the first consideration, even in British sheep husbandry, is shown by the space which Mr. Brown gives to a chapter on the grasses preferred by sheep. We give this chapter at length, as it is suggestive of improvements which may be made in that direction in this country.

"The Grasses preferred by Sheep."

"Nothing can be more important, and more deserving the attention of the flock-master, than the natural *food* of his subjects; and yet nothing connected with sheep has received so little attention, either at his hands or those of scientific men. There appears to be a literal belief in the proverb that "sheep have golden feet, and *wherever* the print of them appears the soil is turned into gold" — or grass — for this subject.

THE GRASSES OF BRITAIN MOST FAVORABLE FOR SHEEP.

No.	Botanical Name.	English Name.	Flowers in	Prevailing Locality.	Nature of Soil Preferred.	Prevailing Altitude.	Remarks.
1	<i>Anthoxanthum odoratum</i>	Sweet-scented Vernal,	April 1,	General,	Deep and moist,	Under 3,500 ft.,	Said to give a flavor to mutton. Much liked.
2	<i>Alopecurus pratensis</i>	Meadow Foxtail,	" 4,	"	Rich,	" 1,500 "	
3	<i>Poa annua</i>	Annual Meadow,	May 4, and all summer	"	Various,	All over,	
4	<i>Poa pratensis</i>	Smooth-stalked Meadow,	June 1,	"	Various,	Under 3,000 "	{ Common in Lincolnshire, & Devonshire, where fattening of stock is celebrated. The greatest favorite. A favorite.
5	<i>Trisetum pratense</i>	Narrow-leaved Oat,	" 1,	"	Chalky and various,	" 2,500 "	
6	<i>Melica uniflora</i>	Wood melic,	" 2,	"	Clayey,	800—1,500 "	
7	<i>Dactylis glomerata</i>	Rough Cock-foot,	" 2,	"	Damp and shady,	Under 1,000 "	
8	<i>Bromus arvensis</i>	Taper fieldbrome,	" 2,	"	Rich,	" 500 "	
9	<i>Festuca ovina</i>	Sheep's Fescue,	" 2,	"	Dry and sandy,	Up to 4,000 "	
10	<i>Festuca durinacula</i>	Hard Fescue,	" 2,	"	Various,	Under 3,000 "	
11	<i>Lolium perenne</i>	Rye-grass,	" 2,	"	Various,	" 1,000 "	
12	<i>Anhenatherum</i>	Oatlike, soft,	" 3,	"	Clayey,	" 1,500 "	
13	<i>Poa trivialis</i>	Rough-stalked Meadow,	" 3,	"	Rich, moist, and sheltered,	" 500 "	
14	<i>Poa nemoralis</i>	Wood-meadow,	" 3,	England, Norfolk,	Rich, [ous, Chalky and vari-	" 1,500 "	Very good..
15	<i>Hordeum pratense</i>	Meadow Barley,	" 4,	"	Marshy,	" 500 "	
16	<i>Alopecurus alpinus</i>	Alpine Foxtail,	July 1,	Grampians,	Not "	" 2,500 "	
17	<i>Cynosurus cristatus</i>	Crested Dogtail,	" 1,	General,	Micaceous,	Under 2,000 "	A favorite. do.
18	<i>Bucetum pratense</i>	Meadow Fescue,	" 1,	"	Various,	" 500 "	
19	<i>Triticum caninum</i>	Bearded Wheat,	" 1,	"	do. but moist,	" 1,000 "	
20	<i>Trisetum flavescens</i>	Yellow Oat,	" 2,	"	do. chalky,	" 1,000 "	Devonshire.
21	<i>Agrostes setacea</i>	Bristle-leaved Bent,	" 4,	S. W. England,	Sandy heath,	" 1,000 "	
22	<i>Bucetum loliaceum</i>	Long-glumed Bucetum,	" 4,	General,	Meadows,	" 1,000 "	
23	<i>Bucetum elongatum</i>	Elongated Bucetum,	" 4,	"	Meadows,	" 1,000 "	

"When an investigation is made as to which of the many grasses, natives of this country, are really of any agricultural value, and the number is again revised for those of them good for sheep, and preferred by them, it is surprising how the list diminishes, and comes down to about two dozen. That this is the case is abundantly shown from the experiments made by the Duke of Bedford, or rather his gardener, Mr. Sinclair; and, as is shown in several more modern works, specially on grasses, as well as from miscellaneous papers.

"I give a table of those grasses natural to the British Isles, and which are found to be most favorable for sheep. They are arranged in order of *priority of flowering*. The figure after the month denotes the week of that month.

"Several things are to be gathered from this table; and the important ones are earliness, altitude, and nutritive value. Though flowering is no indication of the time when a fresh bite may be had, it is a guide as to what date previously the leaves of the particular plant may be had for sheep, as also to the probable duration of it for autumn use. These points are most important to the grazier. It will be observed that two of the grasses flower in April, twelve in June, and eight in July. The annual meadow grass, while common to all the summer months, may be set down with the average of the fourth week of May. Taking the second and third week of June as the average date of the flowering of those grasses best liked by sheep, we are struck with the apparent lateness of it; but have to reflect, as already hinted, that much herbage, both of the favorable and other grasses less liked by sheep, is available long previous to that time,—the peculiarities of situation determining earliness. The liberal, kind provision of nature is apparent in distributing these grasses over no less than four months of the year, with, in the case of our subject, the greatest favorite in the middle period, in all parts of the country and at all altitudes. There are comparatively few grasses peculiar to localities, and at the same time of any agricultural value. There is, as a general law, not so much relation of earliness and soil to altitude as is generally imagined. Local specialities, without reference to soil or height above sea level, will often make a difference of not less than a fortnight in the early keep of a district. The diversity of the same species is observable however. We have, for example, the meadow foxtail flowering in the end of April, on a rich soil, and confined to 1,500 feet altitude; while the

Alpine foxtail does not flower till July, in a marshy soil, and does not come under 2,500 feet.

"The smooth-stalked meadow grass, again, flowers about the 1st of June, and extends to 3,000 feet; but the wood meadow grass chooses a better soil, and is confined to half that altitude; and the narrow-leaved oat-grass, and its brother yellow oat-grass, while both liking chalk, keep under 2,500 and 1,000 feet respectively, with a month's difference in flowering.

"This property of family variety gives to all natural pastures — which invariably possess a number of species — a great superiority over artificial grounds, where generally, only a few kinds are sown. With the exception of *Lolium perenne*, or rye-grass, all those in the foregoing table are *permanent* growers, and suitable for pastures and hay. The clovers are too well known to require any notice. The red, white, and yellow, and their varieties prevail in Britain, on light, rich, limy, dry soils and altitudes under 1,500 feet. It is also unnecessary to give a scientific description of any of the grasses, as to the general reader, and practical grazier in particular, such a way of making up a book is especially disagreeable. It is worth knowing, that under close grazing the rough cocksfoot is apt to die out, but its place is soon filled up by the finer sorts. Some of the grasses, such as rough-stalked meadow and yellow oat, are very sociable, and, unless in company with others, are liable to pine away. The smooth-stalked meadow grass is very hard on the soil, which it impoverishes with its long creeping roots. Everybody knows the annual meadow grass from its growing literally *everywhere*, from mud-holes at the sea-side to alpine crevices, and it is often looked upon as an annoying weed. For earliness, reproduction, and permanency, the meadow foxtail deserves attention. The crested dogstail is remarkable for withstanding a long drought. The sweet-scented vernal, or spring grass, while the earliest of all, is also one of the most permanent, and, from its strong scent, gives the well-known "hay smell," and is said also to flavor mutton with the same constituent.

"It is not too much to affirm that even one class of sheep prefer grasses that another would pass over, and this because, a certain constitution or state of body having to be kept up, nature allows the animal to select the kind of food best adapted for it. For example, the Downs live well on the bent, sheep's fescue, hard fescue, and crested dogstail; while upon these, without an intermixture of cocksfoot, meadow fescue, foxtail, and the clovers, the Lei-

cesters would make a poor show. Let me impress, in concluding, the primary importance of this food subject; that the nature of the grasses and their nutritive qualities, even at different times of the year, is the making of the sheep; the different breeds of sheep have their particular favorites; different lands produce different grasses, or different grasses prefer certain soils and localities, both for meadows, uplands, and hills. 'Roughness' and a 'good sole' are no signs of quality, either for sheep or cattle; and the farmer or grazier who is content with either, irrespective of more important adaptabilities is no honor to, nor deserves well of his country, though he should make 'twenty blades of grass grow where only one grew before.'"

PROCEEDINGS OF THE ASSOCIATION.—GOVERNMENT MEETING.

IN pursuance of previous notice a meeting of the Government of the NATIONAL ASSOCIATION OF WOOL MANUFACTURERS was held at the St. Nicholas Hotel, in the city of New York, on Wednesday, the 26th of May. The President, Mr. J. WILEY EDMANDS, in the chair.

The subject of the participation by the Association in the International Exposition of 1876, was the topic which principally occupied the attention of the government.

The Report of the Committee, consisting of Messrs. MUDGE, PORTER, STITT, and SPENCER, appointed at the last meeting, to consider the subject of the Exposition, was read, and the following communication from Mr. E. B. BIGELOW bearing upon the same question:—

Boston, May 24, 1875.

Hon. J. W. EDMANDS, *President of the National Association of Wool Manufacturers.*

DEAR SIR,—I regret extremely that my engagements are such as to prevent me from attending the Government Meeting of our Association, the 26th instant.

The Centennial Anniversary of the Nation's birth will be an occasion of patriotic interest to every American citizen. Whatever may be the views of our members as to the propriety of signaling it by an *International* Exhibition, such an exhibition is sure to take place, and it is their duty to do all they can to make it a success.

The duty of the Association rests on different grounds. I thought at first that it could properly take an active part in the enterprise, aid its members in displaying their fabrics, and at the same time advance its own interest, and that of the Exhibition; subsequent reflection, however, has led me to a different view of the subject.

The executive managers of the Exhibition must necessarily determine the classification of the articles to be exhibited, and prescribe rules for the guidance of the exhibitors. The several States, also, must have their sub-regulations.

Now, should the Association decide to engage actively in the cause, where could it find standing room? What is there that it could do and not conflict with the classification, rules, and regulations just alluded to?

Moreover, the Association (being national) to occupy a consistent position at Philadelphia, must have charge of all the American woollen goods exhibited, which is impossible; for we cannot suppose that any considerable number of *non-members* would exhibit under its auspices.

In view of these conditions and the great responsibility it would involve, I hope the Association will take no formal or official part in the Centennial Exhibition.

The necessity of taking such a position can hardly be regretted, as all the time and energy of the Association will be needed to make suitable preparation for the approaching struggle on the tariff question. What effect the Exhibition will have on this question remains to be seen. That it will be considerable in one way or another, there can be no doubt; and the free-traders, sustained by their foreign allies, and encouraged by present political tendencies, will demand at the next session of Congress a general reduction of customs duties.

In regard to the duties on wool and woollens, the Association has a special responsibility, as it was through its agency mainly that they were enacted. If those duties are to be maintained, or to be modified wisely, it must be done through the same agency.

We cannot expect to have a tariff *system* better adapted to promote the development and prosperity of the wool and woollen interests than the one we now have. It may, perhaps, be improved in some of its details. Could the wool growers see it to be for their interest, as I believe it to be, to consent to some reduction of the duties on wool, with a corresponding reduction of the duties on wool manufactures, a change in the right direction might be made, and one that would tend to allay opposition and preserve the present system. It is for the wool growers, however, to take the initiative. The wool manufacturers should strive earnestly to preserve the present system, that is, *relative* rates of duties on wool and woollens; for, should that system be given up, uncertainty, instability, and possible ruin would be the consequent condition of their business.

It is a matter of surprise to me that there should be any considerable number of wool manufacturers, whether members or non-members of the Association, arraying themselves in opposition to this tariff. What would they have in place of it? Would they have free-trade? No: they say, give us free wool. Would not the reasoning that would justify free-trade in wool also justify free-trade in wool manufactures? Would they disturb the basis of the present wool tariff, and take the risks of hap-hazard legislation, such as gave us the tariff of 1846? Is it probable, on the whole, that they know themselves what they really want?

Hoping that the Association will receive the support necessary to prevail in the approaching tariff struggle,

I am, very truly yours,

E. B. BIGELOW.

A very interesting discussion then took place in relation to the action of the Association, during which the correspondence of the Secretary with the Director-General of the Exposition was read. Messrs. EDMANDS, ROBINSON, PORTER, ROBERTS, and MAXWELL took part in this discussion. The sentiment of the meeting as evolved by this discussion was, that the Association, by having an Exposition of its own, might conflict with the arrangements of the States, each of which would display its own industries, that the Association with its limited resources could not undertake the responsibility and expense of providing for the Exhibition of all the woollen manufacturers of the coun-

try, yet that it ought, so far as in its power, to promote the Exposition and render itself auxiliary to its objects. Upon motion of Mr. ROBINSON the report of the committee was laid upon the table.

Upon motion of Mr. PORTER it was voted that the executive officers of the Association prepare, and issue a circular, to be addressed to all the woollen manufacturers of the United States, urging them individually to co-operate in the Exposition, and that such information should be obtained and circulated as would aid in making the Exhibition of woollen manufactures creditable to the country.

A communication was read by Mr. EINSTEIN, President of the Raritan Wool Manufacturing Company, detailing the action which had been taken by him and others to prevent the frauds upon the revenue in the importation of cow-hair goods.

The subject of the revival of the Executive Committee of the Association was brought up by the President, in view of vacancies in old committees, and the importance of having, during the impending tariff discussion, the views of the Association indorsed by men of acknowledged influence and position in the wool manufacture.

The following gentlemen were unanimously elected members of the Executive Committee : —

J. WILEY EDMANDS,	GEORGE ROBERTS,
E. B. BIGELOW,	E. R. MUDGE,
THEODORE POMEROY,	CHARLES L. HARDING,
J. W. STITT,	SAMUEL HARRIS,
JOHN A. BURLEIGH,	GEORGE MAXWELL.

The meeting then adjourned.

The following circular has been sent to all the woollen mills in the United States, containing two sets and over : —

*Office of National Association of Wool Manufacturers,
11 Pemberton Square, Boston.*

THE INTERNATIONAL EXPOSITION OF 1876.

Appeal to the wool manufacturers of the United States, —

SIR, — In pursuance of a resolution of the Government of the

National Association of Wool Manufacturers, the executive officers of the Association appeal, not less to their own members than to each of the wool manufacturers of the United States, for a contribution of the several fabrics of their manufacture for exhibition at the International Exposition of 1876, to open at Philadelphia on the 19th day of April next.

The Government of the National Association of Wool Manufacturers consider that the Association would be unmindful of its mission, of promoting by every legitimate means the advancement of the great branch of national industry which it aims to represent, if it should fail to urge upon the wool manufacturers of the United States the motives, both of patriotism and interest which should impel them to take part in the great national industrial display of the Exposition of 1876.

The industrial achievements of the first century of our national independence can find no more brilliant illustration than in the progress of our own manufacture. This progress we would show to our people, and to the nations of the world, whom we have so boldly challenged to compete with us. Whatever misgivings there may have been as to the international feature of the Exposition, that feature exists and imposes the necessity upon our own manufacturers of making a creditable display of our national products.

Diffidence in exhibiting our fabrics, from the apprehension of foreign superiority, would be unwise, and we believe ungrounded. We are confident in our capacity of proving at the Exposition that our national wool manufacture can of itself furnish all the fabrics of its class required for the necessities and comfort of our people, and can meet to a great extent the requirements of a more limited and luxurious taste in our community. At all events, this Exposition will be regarded as a test of that capacity; and recent declarations of the English press, and the demand by the British manufacturers for a larger space, indicate that our foreign rivals will seize the occasion of the Exposition for obtaining a stronger hold upon our markets, and an influence upon our legislation. In this view, no manufacturer, capable of illustrating by the products of his own mill our capacity for industrial independence, can reasonably decline to withhold them from exhibition.

From the view above suggested of a leading object in the Exposition, it is obvious that the exhibition of fabrics should not be confined to those of high cost. Excellence in manufacture consists in adaptation to the wants of consumers. Each manufacturer,

while not omitting exceptional illustrations of invention and skill, should exhibit the fabrics, whether fine or coarse, high or low-priced, which his experience has proved fitted for popular consumption.

The motives of personal interest which might influence manufacturers to take part in the Exposition are so obvious that they need hardly be suggested. Manufacturers will appreciate the fact that it is scarcely possible that any other opportunity can occur so favorable for displaying their goods to the great American public, and for securing a recognition ordinarily to be obtained only by costly advertisements.

The National Association of Wool Manufacturers has given the subject of the Exposition much deliberation at several meetings. It has finally found itself precluded from taking any direct part in the Exposition, by the committal of the responsibility of preparation for the Exhibition to organizations in the several States. The only part left to the Association is that of helper in this great work, both to individual manufacturers and to the Exposition.

The executive officers of the Association will endeavor to obtain all information useful to proposed exhibitors of woollen manufactures irrespective of their membership of the Association, and will be happy to receive any communications on the subject of the Exposition, which should be addressed to the Secretary, No. 11, Pemberton Square, Boston, Mass.

Respectfully, your obedient servants,

J. WILEY EDMANDS, *President.*

JOHN L. HAYES, *Secretary.*

ALLEGED COW-HAIR GOODS FRAUDS.

OFFICE OF NATIONAL ASSOCIATION OF WOOL MANUFACTURERS,
11 Pemberton Square,

BOSTON, June 8, 1875.

Hon. B. H. BRISTOW, *Secretary of the Treasury.*

SIR, — The Executive Committee of the National Association of Wool Manufacturers respectfully ask the interposition of the Secretary of the Treasury to prevent the fraudulent evasion of

the proper duty in the importation of a class of goods, which by such evasion seriously conflict with the products of our own mills.

The immediate subject of our complaint is, the admission at a duty of only thirty-five per cent, instead of a duty of fifty cents per pound and thirty-five per cent, of a class of cloths imported from England under the names of sealskins, veloms, Ulster-coatings, chinchillas, overcoatings, &c., being goods alleged to be made of hair and vegetable fibre without the admixture of wool in any shape, and hence claimed to be not subject to the duty chargeable on woollen goods. At a recent meeting of the government of the National Association of Wool Manufacturers, the subject received the most earnest attention.

Specimens of the goods in question were exhibited, and the assertion was made by skilled manufacturers, and confirmed by our own experience as manufacturers, that they could not be fabricated without an admixture of wool.

It was asserted, as we believe correctly, that at a recent trial in one of the United States courts, in the First Circuit of New York, where the character of these goods was in controversy, the testimony was offered of mechanical experts—who had made the kind of goods in question in the very district in England whence they are imported—to the effect that they never have been, nor can they now be, made without the admixture of a considerable proportion of wool. It was alleged that this testimony was confirmed by that of expert microscopists who had seen the well-known marks of wool fibre in these goods; and it was shown that this testimony was met solely by the negative testimony of an *employé* of the Government who had not detected wool fibre by a microscopic examination.

It was also shown that the negative testimony of this single microscopist, who had already given an opinion, and was naturally influenced to stand by it, was the only evidence upon which the Government relied for establishing the fact that these goods contained no wool.

The above facts have been submitted to the Executive Committee of this Association.

The undersigned—the Executive Committee—submit, that the undoubted evidence of experts who have made similar goods in England is so important as to throw suspicion upon any declaration of importers that the goods in question contain no wool; and show that positive and not merely negative evidence should be

required to prove that the goods in question do not contain wool ; and they assert that the inherent difficulty of making these goods without wool should demand of the department positive proof that they are not made with an admixture of wool. They protest against the determination of the fact of the existence of wool in these fabrics by the negative testimony of any single microscopist, above all by one who has already given an opinion.

The Committee assert, that negative testimony upon this point is not to be relied upon, on account of the difficulty of determination by microscopic examination. In proof of this difficulty they beg to refer to accompanying extracts from the work of Mr. Youatt, who first determined by microscopic examination the distinctive qualities of wool-fibre no later than 1836;* and the Committee ask, that, if the microscopic test is to be applied, it shall be done by microscopists to be selected by learned societies, or by the Secretary of the Treasury, after a conference, both of importers and manufacturers, represented by the Association.

The Committee have no hesitation in expressing their conviction that a fraudulent evasion of the proper duties on the goods in question is systematically pursued, —injurious both to importers and home manufacturers as well as the Government, — for which there is no present remedy but the interposition of the Secretary of the Treasury.

While the undersigned are free from all doubt that the goods in question are substantially spun with woollen fibre, and deem it the duty of your department to determine this question by the light of evidence and *true scientific* tests, they conceive that there is another ground upon which these goods should be subjected to the full wool duty.

Section 2499 of the Revised Statutes declares : "There shall be levied, collected, and paid on each and every non-enumerated article which bears a similitude either to material, quality, or texture, or the use to which it may be applied to any article enumerated in this title, is chargeable with duty, the same rate of duty which is levied and charged on the enumerated article which it most resembles in any of the particulars before mentioned." The similitude of the fabrics in question, both in quality and texture, and the uses to which they may be applied, is too obvious for recapitulation. They are introduced to take the place of

* The extracts from Youatt are here omitted.

woollen goods, and would be placed among woollen goods in any well-classified department of a dry-goods department.

Upon the whole, in our opinion, the evidence of fraud in these importations is so obvious, that the burden of proof of establishing that they are not included in woollens should be thrown upon importers.

We have the honor to be, respectfully,
Your obedient servants,

J. WILEY EDMANDS,	}	<i>Executive Committee.</i>
E. B. BIGELOW,		
THEODORE POMEROY,		
J. W. STITT,		
JOHN A. BURLEIGH,		
GEORGE ROBERTS,		
E. R. MUDGE,		
CHARLES L. HARDING,		
SAMUEL HARRIS,		
GEORGE MAXWELL,		

JOHN L. HAYES, *Secretary.*

TREASURY DEPARTMENT,
WASHINGTON, D. C., June 28, 1875.

JOHN L. HAYES, Esq., *Secretary National Association
of Wool Manufacturers, Boston, Mass.*

SIR,—I have the honor to acknowledge the receipt of a communication, under date of the 10th instant, signed by the Executive Committee of the National Association of Wool Manufacturers, asking “the interposition of the Secretary of the Treasury to prevent the fraudulent evasion of the proper duty in the importation of a class of goods which, by such evasion, seriously conflict with the products of our (your) mills,” the class of goods referred to being cloths known under various descriptive terms, but alleged to be made of hair and vegetable fibre, without the admixture of wool, and which have heretofore been admitted at thirty-five per centum *ad valorem* instead of, as the Association claims they should be, at fifty cents per pound and thirty-five per centum *ad valorem*, as manufactures in part of wool.

In support of said application the Executive Committee refer to the results of investigations made by the Association at New York; also to the work of Professor Youatt, of London, on sheep, their

breeds, management, &c., extracts from which they enclose, also to the provision in the Revised Statutes known as the "similitude clause," and, after reiterating the charge of a systematic and fraudulent evasion of duties on this class of goods by importers thereof, request, in effect, a decision that such goods are subject to duty under the provisions in the tariff relating to manufactures in whole or in part of wool.

In reply I have to state, in view of the fact that the whole subject is under advisement, pending the result of an examination recently requested by this Department under the provisions of the Act of Congress incorporating the National Academy of Sciences (12 Statutes at Large, 806, section 3), I deem it inexpedient to comply with said request.

It may be proper in this connection to remark that the evidence hitherto submitted, including that presented in your communication, while tending to show the difficulty of determining the questions involved, do not, in the opinion of the Department, justify the conclusion that a fraudulent evasion of duties on the goods in question is systematically pursued.

If the Association is in possession of evidence which would justify the government either in seizing as fraudulent any particular importation or prosecuting any importer or other person knowingly concerned therein, it is the duty of the Association to inform the United States District Attorney thereof at once, and it would then be the duty of that officer to proceed immediately for an enforcement of the law applicable to the case.

In reply to the suggestion offered by the Association that the burden of proof to establish that these importations are not manufactures of wool should be thrown on the importers—in other words, that the Department should apply the wool rates leaving importers to their remedy by protest, appeal, and suit—I have to state that, although this would be a speedy method of disposing of the question, yet should such decision eventually be reversed by the courts, the government would not only be compelled to refund, with interest, the excess of duties thus found to have been wrongfully collected, but would be subjected also to the payment of costs and expenses in each suit brought to recover such excess. Moreover an injustice would have been done to the importers which might have been avoided by more deliberate action.

There are now pending in the Southern District of New York, as the Department is informed, hundreds of calendar cases involv-

ing constructions of the tariff, being suits brought against collectors to recover duties alleged to have been wrongfully exacted. These cases remain upon the calendar, term after term, costs and expenses accruing accordingly, until some one of a class of cases is brought to trial the result of which may govern all pending suits involving the same question. Owing to the crowded condition of the calendar much delay necessarily ensues in the disposition of revenue cases, and hence one party or the other must eventually be subjected to a heavy expense caused solely by such delay. If the importer is successful the result shows that he has been compelled to resort to the tedious and expensive remedy of a suit at law, to recover what he should never have been compelled to pay, while the government is subjected to expenditures which, by a correct decision in the first instance, would have been avoided.

For these reasons the Department is clearly of opinion that no final decision should be made on the question to which the letter of your Association refers, until all reasonable means for enabling it to do so intelligently and conclusively, shall have been first exhausted.

I am, very respectfully,

B. H. BRISTOW, *Secretary*.

NATIONAL ASSOCIATION OF WOOL MANUFACTURERS,
Office, 11 Pemberton Square,

Boston, Mass., July 1, 1875.

Hon. B. H. BRISTOW, *Secretary of the Treasury*.

SIR,—I have the honor to acknowledge the receipt of your letter of June 26, 1875, in reply to a communication of the Executive Committee of this Association in relation to seeming frauds in the importation of fabrics commonly known as cow-hair goods.

Your communication has been submitted to such members of our Executive Committee as are accessible, and I am requested by them to express their obligations for the respectful consideration which their communication has received at your hands, and their satisfaction that the most important object in their application has been secured by your reference of the scientific questions involved to the National Academy of Sciences.

I have the honor to be, respectfully, your obedient servant,

JOHN L. HAYES, *Secretary*.

Industrial Miscellany.

BANQUET OF THE SILK ASSOCIATION OF AMERICA.

THE third annual dinner of the Silk Association of America, at which we had the honor to be a guest, even surpassed the previous brilliant reunions of that association, which were so memorable. It was given at Delmonico's on the 12th of May last. In the elegance of the appointments, and the liberality of all the festal arrangements, it surpassed any entertainment which we have ever attended. But the characteristic feature of the occasion was the æsthetic taste which presided over all the arrangements. The genius of the accomplished Secretary, Mr. Allen, was everywhere apparent, although he kept himself personally so modestly in the background. It is fortunate that a manufacture whose success depends so much upon æsthetic influences should have at its command so much intellectual and artistic refinement.

The silk importers and manufacturers present were :—

A. B. Strange, E. B. Strange, William Ryle, F. O. Horstmann, George B. Skinner, William Skinner, William Iles, B. Richardson, Albert Tilt, John N. Stearns, Seth Low and Mr. Bulkley, of A. A. Low & Brothers, Mr. Soleliac, D. O. Donoghue, Ira Dimock, A. T. Lilly and Mr. Hinckley, of the Nonotuck Silk Company, A. G. Jennings, W. P. Jennings, F. S. Hovey, Edwin T. Prall, William H. Copcutt, Frank G. Richardson, Charles F. Simes, H. L. Brown, John Connah, C. Chaffonjou, S. M. Meyenberg, Louis Franke, Oscar R. Meyer, George R. Dexter, A. Begoden, John D. Cutter, Albert Falk.

The guests present were :—

Hon. Henry C. Carey ; Hon. William D. Kelley ; Mr. John L. Hayes ; Prof. William P. Blake, Chairman of Committee on Classification of the United States International Exhibition ; Hon. T. Tomita, Vice-Consul of Japan at New York ; Hon. George H. Sharpe, United States Surveyor at the Port of New York ; Hon. S. S. Cox, Member of Congress, from New York ; Hon. Benjamin A. Willis, Member of Congress, from New York ; Mr. George L. Catlin, of the "New York Commercial Advertiser."

And among others, the following :—

Park Commissioner Donoghue, Jonathan Odell, James McCreery, of McCreery & Company, silk importers, Abel Dennison, H. V. Allien, and Alexander Delmar.

Letters of regret were received from:—

Hon. Joseph R. Hawley, President of the United States Centennial Commissioners; Hon. J. Wiley Edmonds, President of the National Association of Wool Manufacturers; Hon. Augustus W. Cutler, member elect of the forty-fourth Congress, from Paterson, New Jersey; Sidney Dillon, President of the Pacific Mail Steamship Company; Ambrose Eastman, Secretary of the New England Cotton Manufacturers' Association; James M. Swank, Secretary of the American Iron and Steel Association; Cyrus Elder, Secretary of the Industrial League, Johnstown, Pa.; Hon. A. T. Goshorn, Director General of the International Exhibition; General C. A. Arthur, Collector of the Port of New York.

From the letters read at the dinner, we select the following:—

MORRISTOWN, N. J., May 11, 1875.

FRANKLIN ALLEN, Esq., Secretary of the Silk Association of America.

MY DEAR SIR,—Yours of the 7th May was duly received, in which the hope was kindly expressed that I should be with your association on the 12th inst., at their third annual dinner.

But a professional engagement in the State of Michigan, at that time (which I have made an ineffectual attempt to arrange, since the receipt of the invitation, at the hands of our mutual friend, Mr. Dale), prevents my being present. I should be glad to be present, and respond to the sentiment: "The Congress of the United States," as you suggest; for I cannot forget how the various industries of the District, to a great extent, owe their success and prosperity; the people, their wealth and happiness; labor, its proper remuneration and reward; and the District itself, its large and increasing population, to the wise legislation of Congress.

Nor can I fail to realize that unwise legislation, by the same Congress, would close our mines, stop our factories and shops, throw out of employment thousands of miners, operatives, and mechanics, bring ruin and disaster upon the interests of our people, and cause a blight to fall upon her industries.

Nor *will I forget* that it is the duty of the representatives, to continue to secure such wise legislation as will ensure continued prosperity and wealth to our industries; add to the happiness and comfort of the people; induce wealth and capital to make investments in our borders; open mines; erect shops, machinery, factories, and furnaces in our midst; and thus invite labor, and secure increasing population.

Government has been slow in recognizing the necessity of wise legislation toward your particular branch of industry, an industry that within a few years has grown to such vast proportions in this country, and is of so great importance to the district; but the late Congress has been more kind, and is now affording to you what you need, what you require, and that which government should continue to bestow, — "*Protection.*"

I need not say to you that I take great pride in the success of the various industries of this district, and that I point with pride to the mines in our mountains, to the furnaces and factories at Dover, Whippany, Boonton, Paterson, and Passaic, the result of the *protection* that Government has heretofore afforded them.

I assure you that I take great pride in the silk industry of Paterson, and am proud to represent in the Congress of the United States the city of Paterson, which has earned for itself the title of "The Lyons of America."

Regretting my inability to be present, and thanking you, personally, for the many acts of kindness and courtesy extended to me, and with the hope that my congressional career will prove of positive benefit to the various industries of my district, state, and country, and that the silk interest will continue to increase and prosper,

I subscribe myself, yours truly,

AUG. W. CUTLER.

Boston, May 10, 1875.

DEAR SIR,—I have the honor to receive your invitation to the dinner of the Silk Association of America on the 12th inst.

It would afford me much pleasure to meet with the representatives of so important a branch of the American industries on this occasion; but I find that I cannot accept, being unable to arrange my engagements, so as to be in New York on Wednesday, which I much regret.

All that is done in extending the range of industrial art through individual and associate work, is of national importance, and such are the relations and interdependence of all the branches of domestic industry that the cause of one becomes the cause of all. The silk manufacturers and the wool manufacturers will stand together, being alike interested in the character of the legislation which is to affect our national policy and alike opposed to those who would give free introduction to foreign fabrics practically to the exclusion of our own.

Yours very truly,

J. WILEY EDMANDS.

TO THE SECRETARY OF THE SILK ASSOCIATION OF AMERICA,
98 Duane Street, New York.

The regular toasts were as follows:—

THE PRESIDENT OF THE UNITED STATES: The friend of American industries.

OUR COUNTRY: She naturalizes the foreigner and his arts alike.

MANUFACTURES: At once an evidence and a measure of civilization.

JOSEPH MARIE JACQUARD: The Columbus of textile manufactures.

OUR TEXTILE INDUSTRIES: The nation's fostering care has made them the nation's pride.

THE CENTENNIAL EXHIBITION OF INDUSTRY IN 1876: May its success be commensurate with its deserts.

THE SILK ASSOCIATION OF AMERICA: The cocoon whence are spun silken threads of friendship.

THE CONGRESS OF THE UNITED STATES: The varied industries of our people bear testimony to the wise legislation of their representatives.

OUR CUSTOMS SERVICE: The country depends on it for revenue: the people, for the enforcement of their revenue laws.

THE PRESS: The best of orators in a worthy cause.

THE LADIES: Our best friends.

With our limited space we are unable to reproduce all the replies to these toasts. We omit, but with regret, the excellent addresses of the President, Mr. Dale, Mr. Carey, and Mr. Kelley; and feel justified in this omission, only by the fact that they were printed in the papers of the day. Those which we give below were not so published. Two are given for the above reason, and because they are specially instructive in relation to the silk industry, while the other is given upon the well-known usage of an editor to do no work which he does not turn to account in his columns.

In reply to the toast, "The Silk Association of America: the cocoon whence are spun the silken threads of friendship," Mr. Seth Low replied as follows:—

MR. PRESIDENT AND GENTLEMEN,— Mythology has had its age of brass, and history its middle ages, periods of darkness, or of only partial enlightenment; and the silk trade of America has known the time when there was no Silk Association. Difficult as it is to realize, in the face of such conspicuous unanimity of action as has been displayed to-night by all this company, only three short years ago the members of the silk trade were as jealous of friendly intercourse with their fellows as that aristocratic family of Erin's Isle, whose ancestors, at the time of the flood, occupied a boat by themselves. [A laugh.] But, sir, in due time this association was born at Delmonico's. We have been at home at Delmonico's from that day forth; and the answer to that fireside conundrum, "Why is Delmonico's like home?" comes to us with a peculiar pathos: "Because, sir, it is the dearest spot on earth." [Laughter and applause.] No epoch in our history has passed without our returning, like dutiful sons, to the paternal roof; and I am not aware that any undertaking of moment has ever been begun by us without our seeking for inspiration from kindred sources. [Applause.]

The first work of importance which we had to do was to select a secretary. Need I say that the committee intrusted with that charge, upon the execution of which depended the future of the association, dined first at Delmonico's, and then proceeded to the work in hand? The wisdom of their action, and of their choice, has been each day more and more manifest; and

I am glad to have this opportunity to say, that I have always felt that whatever measure of success has been achieved by this association is largely owing to the intelligent zeal of our enterprising secretary. [Applause.]

Gentlemen, you may well applaud, for he has worked faithfully with no petty purpose, but with the large ambition of giving to the silk trade of America the status among the industries of the nation which it ought to have. Something is due, much is due, also, to the broad views and liberal action of a few of the manufacturers, who have realized, and justly realized, that, however commanding their position in the trade, they have yet interests in common with every member of the ranks, great or small. At one time, during the panic, the life of this association seemed destined to come to an untimely end. In the very midst of that period of gloom and uncertainty, — which came upon us, too, while we were yet comparatively few in number, — our treasury was found to be empty. Our future revenues seemed to be as uncertain as those of the man who reported to the collector of the income-tax an income of \$2,500 a year, with the remark, that thereafter he considered it would be precarious, as the man had died from whom he had borrowed the money. [Laughter.]

But, sir, at that epoch was manifested the faith which has made the Silk Association the acknowledged representative of the trade at large, and it sprang in the main from the very men who have fought successfully the battles of this industry, against every discouragement and hinderance which it has had to meet. From that hour we have grown apace; and it has been the beneficent purpose of this association to strengthen and develop the common interests; for we have indeed interests in common. The legislation which affects one affects all, whether for good or ill; and it is only through such an organization that the united voice of an industry can be heard. But, more than this, such an association as ours attracts attention, and gives information, not only to our lawmakers, but, what is of vastly more importance, to the people.

When our countrymen learn that silks are being manufactured in their midst to the value of from \$16,000,000 to \$20,000,000 every year, they want to give them a trial; and that, gentlemen, is all we ask. [Applause.] We do not ask our neighbors to buy inferior silks, because they are made at home; but we do ask them not to condemn our silks because they have been told they were not made abroad. And, in my judgment, nothing can so further the interests of this industry as to publish far and wide throughout the land the figures representing the extent to which silk goods of American manufacture are actually consumed.

But, Mr. President, my theme to-night suggests rather the social than the business aspects of this association, and the thought is obvious that that is a good thing which enables us to meet under such pleasant auspices so many distinguished friends as we have with us to-night. Nor does this occasion stand alone; we have been guests as well as hosts, and in our affections, next to the ladies who consume our goods, stands the Pacific Mail, whose good things we have on two occasions helped to consume.

Gentlemen, we may well acknowledge a liberality of entertainment so profuse as theirs. And next my thoughts fly southward to Philadelphia, where so many of us were entertained by one of our own number. Sir, there is in Athens a statue of Victory, sculptured wingless, and in the act of stooping to unloose her sandals, because in Athens she would remain; and a kindred figure of Hospitality, with wings removed and sandals loosed, to indicate that there, indeed, she had found a home, might well be placed above the portal of that friendly mansion in the city of Brotherly Love. [Applause.]

Does any one believe, can any one believe, that the *morale* of a trade is not elevated by participation in courtesies such as these? No, they are all good, and help to develop the higher nature, and to make of business something more than a means of livelihood, or a source of profit.

So, Mr. President, by such means and by our frequent meetings, are being spun the silken threads which mark the friendships of this association. The peculiarity of the silk cocoon which renders it of so much value is the strength of its fibre. Through this property the gossamer thread, almost imperceptible to the eye, is made to assume a thousand forms of beauty and of usefulness. May the friendships which spring from this association, like the silken threads to which they are compared, be of that sturdy stuff that shall endure the strain and wear of time, and only gain in power as they grow in years. [Applause.]

Mr. William Strange, of New York, responded to the toast, "Joseph Marie Jacquard: the Columbus of textile manufactures," as follows:—

MR. PRESIDENT AND GENTLEMEN, — I should feel great diffidence in responding to the toast which has been assigned to me, were I not positive that neither the eloquence of a Demosthenes, nor the incompetence of a Strange, could add or detract one iota from my glorious subject; and as you, therefore, are to be the only sufferers from this imposition upon you on the part of the dinner committee, I hope you will consider it accordingly.

At the entrance to the Zoölogical gardens, in one of the cities of France, there stands a monument in bronze, bearing this simple inscription, —

"TO JACQUARD,
the City of Lyons is grateful."

And this is the only public recognition which the place of his nativity has deigned to bestow upon one whose genius, patience, toil, and self-sacrifice have elevated it to its present distinguished position in the manufacturing world, and saved thousands upon thousands of his fellow-beings from a fate worse than death; while its streets are crowded with statuary and columns erected in honor of heroes whose claims to gratitude are not to be mentioned by the side of those which the life of Joseph Marie Jacquard presents.

Born July 7, 1752, he was left, according to custom at that time among the humbler classes to which he belonged, without any of the advantages of education, and spent his boyhood in constructing miniature houses and castles of wood; it was thus that from early infancy his mind was trained for the great work of invention, which was destined later to revolutionize the entire weaving industry.

In his youth he took a strong dislike to his father's occupation, which was that of a master weaver, and mourned over the hardships which his parents were compelled to bear, in efforts to provide the mere necessities of life, and it is to his filial affection and an earnest desire to relieve from misery the women and children who, at that time, were employed as leash-drawers, that we owe the production of the far-famed Jacquard machine.

It was exhibited for the first time at the National Industrial Exposition, in the month of September, 1801, and received as a premium a bronze medal, the lowest class prize; while others, whose names and works have long since been forgotten, were awarded medals of gold.

But this failure on the part of the judges to recognize the value of his invention did not discourage the great philanthropist, who found a higher reward than they could bestow in the knowledge of his own success, and the satisfaction of having discovered a machine which would prove to his countrymen beneficial.

But great, indeed, was his disappointment and chagrin, when, instead of gratitude, he received maledictions and threats from the very class for whose benefit he had labored. He was called the pest of the factory, and his name was execrated by the manufacturer first, who, realizing the worth of his invention, feared that by its means foreigners would become as skilful as themselves, and thus break up the monopoly of the silk trade, which they had thus far enjoyed; and next by the workmen, who, in their blind ignorance, believed that its adoption would rob them of the means of livelihood, and reduce them to beggary; and so far did their fears and rage get the mastery over them, that they formed in a body and marched upon the Palace of Arts and Sciences of Lyons, where the model had been left for safe-keeping, and burned it in the presence of a crowd assembled for the purpose of witnessing the shameful spectacle.

But out of the ashes rose the phoenix, and the notoriety produced by this very act was the means of introducing the Jacquard machine to the notice of the world; and to-day, not only in silk, but also in cotton cloth, carpet, lace, and in every factory throughout civilization where weaving is carried on, do we find countless monuments in memory of his name. And though his dearly beloved France purchased from him, in 1806, the right to all his invention, both past and future, for the paltry annual pension of 8,000 francs, she would not sell to-day the control of the Jacquard machine alone for the wealth of a nation; and as to the predictions of evil results, from the adoption of this invention, not one of these have come to pass; on the contrary, instead of contracting, it has expanded and improved the sphere of labor, and the pale, sickly, dwarfish operative of fifty years ago has nearly passed away, and

thanks to Jacquard has been supplanted by a hardy and more numerous race of weavers.

Lyons is still the centre of the great silk industry, and although the great, noble, self-sacrificing man is dead, the name of Joseph Marie Jacquard is immortal.

Mr. John L. Hayes, of Boston, Secretary of the National Association of Wool Manufacturers, responded to the toast, "Our Textile Industries: the nation's fostering care has made them the nation's pride," as follows:—

I am aware, Mr. President and gentlemen, that I owe the high honor of being called upon to respond to this sentiment simply to the fact that I am the representative of a kindred industry, and the only one older than your own, — that of wool. But I am so suffused, absorbed, interpenetrated with wool in my daily work, that I am glad to make my own application of an epitaph found on the tomb of a Roman matron: *fecit lanam; munxit domum*. "She worked wool while she stayed at home." Let me work my wool while I stay at home; but, abroad, let me contemplate some other interests than my own.

Although my speech may be *vox et præterea nihil*, which means, "great cry and little wool," I shall venture to draw my first illustration of the grand sentiment of your toast, although really in this presence needing no other illustration than your own experience, from our cotton industry. After the Revolution, when the production of indigo, which had been the chief export of the Carolinas, began to decline in consequence of East Indian competition, Southern statesmen demanded a protective duty upon raw cotton, then brought from the West Indies. By the act of 1783, a duty of three cents a pound was imposed upon cotton. The imposition of this duty was violently resisted by the few manufacturers of New England, and even by Alexander Hamilton, who for once was in error, on the ground that it was a tax on raw material; the same argument now so unwisely made against the wool duties. For seven years this duty was really a tax, and a heavy tax at the time, paid not only by the few factories, but by nearly every family in New England. In ten years the protective duty began to tell. In three years, ending in 1800, the exports of cotton, from Charleston, rose from one million pounds to six and a half million pounds. The fostering care of the nation was exhibited not in protective duties alone: it exercised the highest form of protection in stimulating inventions by patents. This fostered Whitney's genius and produced the cotton gin, which added immeasurably to the profit of producing cotton in America. It was thus, as Mr. Everett says, "radicle and plumule, root and stalk, flower and boll, the cotton plant in America was the foster child of the protective system." And with what results to the country and the world? Of two and a third billion pounds of cotton produced in the whole world, employing a fixed capital of \$600,000,000, and

paying annually \$160,000,000 in wages to 1,200,000 operatives directly, more than half is cultivated in the United States.

Vast as is this result of "the nation's fostering care," it is supplemented by the effect of protection upon our cotton manufacture. But little progress was made in our cotton manufacture until the war of 1812, which acted like a protective tariff. At the close of the war we were deluged with British cottons introduced under the lower duties then prevailing. The tariff of 1816 was passed, imposing a duty of twenty-five per cent on all cotton fabrics, and through the influence of Mr. Lowell a provision was made, that they should be taxed at a minimum valuation of twenty-five cents a square yard, being in effect a specific duty of six and one-fourth cents. By the acts of 1824 and 1828, this minimum valuation was advanced. It is probable that no clause so simple and short in any tariff act ever accomplished so much good. It has been the sheet anchor of our cotton manufacture. Its result is shown in the fact that we are at this time the second cotton manufacturing nation in the world. Of 62,700,000 spindles in the whole world, England has 35,000,000; the United States has 8,000,000; France, 5,700,000; Germany, 4,700,000; and Russia, 2,000,000. The quantity of cotton spun in the United States, as compared with England, is much larger than that indicated by the number of spindles; a vastly larger number being employed on fine yarns. Our production of cotton goods, in weight, is more than half that of England.

Our inventions, stimulated by our command of this industry, such as the "equation box," the "speeders," the "stop motion," and the "ring spinner," have reduced the price of cotton goods throughout the world. The fabrics which we have invented have no less benefited our own people, and those of other lands. Within the memory of those living, the only cotton fabrics worn, except a limited household fabrication, consisted of India cotton, a light, flimsy article made of short and weak fibre. The British shirtings introduced after the war of 1812 were but little better, and the world did not know what sound and serviceable cotton cloths are, until they were made at Waltham, and from there flowed to China, India, and South America, compelling the English to imitate them; or, at least, to forge their stamps and trade-marks. The manufacturer is still living in Cambridge (Mr. Samuel Bachelder) who made the first twilled cotton goods made by power in the world. He first made by power jeans and drillings, the most substantial of all known cotton goods, which now employ over fifty of our own mills, and of which we exported to China alone in ten years 200,690,000 yards. If any textile product can be a nation's pride, it is this, and it was the result of the nation's fostering care.

But this is not all. The policy which has enabled our people to produce has at the same time enabled them to consume. We are the largest consumers of cotton in proportion to our population on the globe. It is stated upon unquestionable authority that we consumed in 1860, not including imports, fifty-two yards per head of our population; and it is also stated on high authority, that we consume a quantity of cotton goods equal to more

than half of all that England makes for home and foreign consumption. What does this consumption signify? It signifies the "clean shirt," the symbol of masculine neatness and personal self-respect; it signifies the clean bed, the symbol of household comfort; it signifies nice underclothing, the best test of personal neatness; it signifies well-clad women and children: in short, it signifies not the luxury of the few but the comfort of the masses. In England, whose policy is to sacrifice her home consumption for the world's consumption, it is shown that in three recent years the consumption of cotton goods by her population was diminished thirty per cent. An English mechanic has shown that England exports enough cotton cloth to be wound of a single width sixty-four times around the globe. What a commentary upon her policy is the fact that a nation which can make a garment for our planet cannot clothe her own people!

I find, Mr. Chairman, that in spite of myself my tutelary genius, Wool, asserts her sway, and I am compelled to take my other illustration of your toast from my own industry. These centennial times compel comparison.

During the Revolution, so scarce in this country was the great staple of my industry that Mr. Otis said there was not enough wool in all New England, although best supplied, to make each inhabitant a pair of stockings. Wool in Philadelphia was worth seven shillings a pound. The people were advised to wear leather breeches. After the battle of Monmouth, an advertisement, substantially like this, appeared in a New Jersey paper: "Found, upon the battle-field, a knapsack, containing one good shirt and a pair of woollen drawers or trowsers. The owner can have them upon paying for this advertisement, \$2.00." What must have been the value of woollen clothing when the honest finder of these articles felt himself obliged to pay two dollars to restore an old shirt and a pair of trowsers to the loser!

Compare the poverty of woollens of that period with the abundance during our late war. Why, our soldiers threw away enough overcoats and blankets in a single battle to have supplied Washington's army. At the close of the war there was an overplus of 2,000,000 overcoats; enough to supply one-third of the voters in the United States. And these were all made of sound and indigo dyed wool. See a crowd of laborers in winter, and you would think that these garments could never wear out. A single mill in Massachusetts has a capacity, working day and night, to keep clothed a million men. Another, in the same town, works up every week the fleeces of ten thousand sheep. In the decade closing in 1870, we increased the manufacture of woollens proper from sixty-one millions to one hundred and fifty-five millions, and nine-tenths of these woollens are made of domestic wool. We have 10,126 sets of machinery, in every State from Maine to Georgia, and from Oregon to Massachusetts, consuming 220,000,000 pounds of wool, besides other fibres. We so completely satisfy our own people that importations of woollens are regularly declining, and one chief trouble of the manufacturer is over-production from domestic competition, of which the consumer gets the benefit. We consume the wool from about thirty million of our own sheep, and encourage the production of animal food, so that the

consumer gains many times more in the cheapness of meat, due to the protective influence of the tariff on sheep husbandry, than he is assumed by free-traders to pay as a tax on his cloth in consequence of the same tariff. The masses of our people are clothed with American woollens, principally by means of the new industry, — the ready-made clothing manufacture, — seven-eighths of whose cloths are furnished by American mills. Few are aware of the cheapness and excellence of these goods, and of their vast consumption. The examples of the high price of woollen clothing here are taken from the product of the fashionable tailor. The people do not wear nor need to wear these products. I bought a complete suit of thick clothes, at a clothing-house last fall, for twenty dollars. One of my sons, at the same time, paid a tailor fifty dollars for a similar suit. Mine was unquestionably the best. The cloth of my suit was made of the best Merino wool. So that our common people wear finer and better cloth than kings wore a hundred years ago; for the kings of Europe a century ago possessed the only Merino sheep. This wonderful clothing manufacture, which is too little appreciated, and which is an offshoot of our woollen manufacture, and the creation of protection, has changed the external aspect of our society. When Alexander, Czar of Russia, visited England, accustomed to seeing his serfs clad in sheep-skins, and astonished at seeing on some public festival an immense public clothed in substantial cloth, he exclaimed, "But where are the people?" But this was a city crowd. In England the rural population are still clothed in rags. If we could imagine the imperial visitor penetrating even the most remote of our agricultural districts, he would say, not "Where are the people?" but, "Where are the *country* people?" The country people, as marked by their garb, have disappeared. City fashions in cut and material prevail alike in country and city. All are dressed alike from New York to Chicago. Uniformity of dress is both a cause and an evidence of social equality. Our woollen manufacture has contributed no little to this social progress, and is thus in harmony with the genius of our institutions. *Cloth* has been called the emblem of the middle class, as silk was of the noble class. May the progress of your silk manufacture and the universal consumption in this country symbolize the transfer of the former distinctions of the noble and privileged to the masses of our people!

Although other illustrations of the sentiment of your toast crowd upon my mind, I will occupy but a moment to make a remark suggested by the cosmopolitan argument of a gentleman who has preceded me. Mr. Cox, in his sprightly speech, intimated that the reliance of our manufactures is to be found rather in the ingenuity and inventive faculty of our people than in the fostering care of the government. Mr. Harriss-Gastrill, late British Secretary of Legation at Washington, in a recent work of five hundred pages devoted to our textile industries, says: "There can be little doubt that the celerity with which every advantage of improved process or labor-saving machinery is brought out and then introduced by the Americans, is owing to the constant pressure of high rates of wages, and the comparatively certain protection of capital invested in inventions." Thus our inventions, upon

which we are told to rely, are themselves the fruits of our national or protective system. As I have shown in cotton, so it can be shown of every manufactured product which we send abroad, our very exports are the overflows of a stimulated industry.

PARKHURST'S BURRING MACHINERY.

WE are pleased to learn that Mr. Stephen R. Parkhurst has recently erected a new factory on an extensive scale, for the construction of his burring machinery. We hope he may receive the long-delayed reward for the great service which his inventions have conferred upon the American wool manufacture. A most expensive litigation, continued for many years, has established beyond question that Mr. Parkhurst was the first to combine a burring apparatus with a carding machine, so that the burring and carding processes can be carried on by combined and continuous operations, thereby saving time, labor, and expense, and dispensing with the imperfect and cumbrous contrivances formerly in use for taking the burrs out of wool.

It is admitted, that no foreign machinery for a similar purpose will compare with Mr. Parkhurst's in efficiency and economy of operation, while his mechanical methods are proved to be greatly superior to the chemical methods of removing the burrs, so largely in use on the Continent of Europe.

It is largely due to this machinery that the wools of California are in increasing demand. The burrs which are attached to these wools would prove an insuperable objection to their use if the remedy had not been provided by the machinery of which we have spoken. Indeed, the benefit conferred by these inventions can be estimated by millions, and entitle the inventor to a distinguished place in the history of our woollen manufacture.

THE MARBLE INDIGO BLUE DYE.

OUR readers may remember that we devoted many pages of the "Bulletin" to what was intended to be an exhaustive essay on Indigo Dyes. Every item or suggestion upon this subject we have since looked at with peculiar interest. Having heard favorable accounts of the process of Messrs. Jerome Marble & Co., of Worcester, we sought an interview with them for the purpose of obtain-

ing definite information. Mr. Marble explained his process, and submitted to us a sample of wool and cotton dyed by his method. We are satisfied that his method of dissolving the indigo is original and philosophical. It makes a "*true blue*" indigo dye. It is peculiarly adapted for giving the lightest shades, although it will give the darkest. One peculiarity of their system is, that they furnished the indigo dye already dissolved in barrels. And the labor and uncertainty of making the wood vat is avoided.

CHRONOLOGY OF WOOL INDUSTRY.

WE published, in 1874, a table of particulars and dates in the woollen industry. The original table was revised for the Textile Directory of 1875, and enlarged by the addition of many interesting items. It may still be greatly improved. We republish the table as last corrected, not only for the information of our readers, but as a means of obtaining still further corrections and additions. We would thank our readers among manufacturers, so many of whom are better informed than ourselves, to note any important fact or date, serving to complete the history of our industry, and to kindly forward to us a memorandum.

SOME PARTICULARS IN RELATION TO WOOL AND WOOLLEN MANUFACTURES, CHRONOLOGICALLY ARRANGED.

Duties on exported wool levied by Edward I.	1275
Seventy families of cloth-workers from Netherlands settled in England by Edward III.	1331
The export of wool from England, first prohibited in the reign of Edward III.	1337
Worsted manufacture started in town of Worsted in the county of Norfolk, England, in	1340
The spinning-wheel, according to tradition, invented by Jergen, of Brunswick, about	1530
The stocking-frame, invented by William Lea	1585
The art of dyeing, which had been lost during the wars of the Roses, brought to England	1608
Sheep introduced at Jamestown, Virginia	1609
And first brought to Boston in	1633
The first fulling-mill erected at Rowley, Massachusetts, by "Mr. Rogers's people, who were the first that set upon making cloth in this Western world"	1643

Manufacture of fine cloth began at Sedan, in France, under patronage of Cardinal Mazaraine	1646
Exportation of wool from England definitely prohibited . .	1660
Which prohibition continued until 1825.	
Broadcloth first dressed and dyed in England by Brewer, from the Low Countries, in	1667
Weaver's loom brought into London from Holland about . .	1676
British and Irish woollens, prohibited in France in . . .	1677
All persons obliged to be buried in woollens by act of 29 Charles II.	1678
British woollens admitted into Portugal, free of duty, by the Methuen treaty, thereby destroying the Portuguese wool manufacture	1703
The fly-shuttle first used by woollen weavers, and used very little by weavers of cotton until 1760, invented by John Kay .	1733
First carding-machine with revolving cylinders made by Lewis Paul, though not generally introduced for twenty years afterwards, in	1748
The first ram let by Mr. Bakewell, the improver of the English Leicester sheep, in	1760
Spanish merino sheep introduced into Saxony by the Elector .	1765
The first fulling-mill in Pittsfield, Massachusetts, started by Valentine Rathbun	1770
Merinos introduced into Hungary by Maria Theresa . . .	1775
Merinos imported from Spain to France	1776
A French manufacturer announced that he had carded wool with success on a cotton carding-machine in	1783
The first machine for spinning wool was tried at Dolphin Holme, England	1784
Spanish merinos introduced into England by George III .	1785
Others obtained in 1792 in exchange for eight coach horses.	
Merinos introduced at Rambouillet, France, by Daubenton, in .	1786
British woollens to the amount of £2,833,490 exported to United States in	1790
Land granted in Ipswich, Massachusetts, to John Manning, on which to build a woollen mill, in	1792
The first woollen factory established and conducted advantageously in America, erected in that portion of Newbury, Massachusetts, known as Byfield Parish	1794
The first carding-machine for wool put in operation in the	

United States, constructed under the supervision of Jehn and Arthur Schofield	1794
Declaration made in Parliament in 1800 that at that time thirty-five persons would do by machinery the work in the woollen manufacture which would have required in 1785, before machinery was introduced, the labor of 1640 persons	1800
Carding-machine erected by Arthur Schofield, at Pittsfield, Massachusetts	1800
The fabric called French merino, introduced by Dauphinot Pallotan, at Rheims, France	1801
Carding-machines for carding wool, and indigo wool dyeing, introduced at New Ipswich, New Hampshire, by James Sanderson, from Scotland, in	1801
The first merinos known to have left full-blood descendants, introduced to United States by Col. Humphreys, the American minister to Spain, on his return from his embassy, in	1802
Gray mixed broadcloth made at Pittsfield, and sold in New York as foreign	1804
Thirteen yards of black broadcloth from which President Madison's inaugural suit was made, manufactured by John Schofield, at Pittsfield, Massachusetts, in	1808
Work in the first woollen mill in the State of New York, erected by Dr. Seth Capron, at Oriskany, Oneida County, New York, Dewitt Clinton being one of the proprietors, in . .	1809
Importations by Wm. Jarvis of nearly 4,000 merinos, 1809 to	1810
The first bale of wool came to England from Australia in . .	1810
Card clothing machine invented by Elijah Smith, of Walpole, Massachusetts, and patented by Whittemore	1810
The loom for weaving figured fabrics called Jacquard, invented by Joseph Maria Jacquard in	1811
Machine for shearing cloth, called a machine with helicoidal shears, introduced into France by George Bass, of Boston, in .	1812
The largest manufactory of fine cloths in New England, the Middletown Manufacturing Company, made daily thirty to forty yards of broadcloth, which sold by the piece at \$9 to \$10 per yard, in	1812
Shoddy first introduced at Batley, England, about	1813
The Pittsfield Wool Manufacturing Company, Lemuel Pomeroy & Co., incorporated	1814
The Glenham Wool Manufacturing Company Mill erected in Dutchess County, New York	1814

The principle of helicoidal shears, introduced by Bass, adopted by Collier, of Paris, in 1817

Saxony merinos introduced into United States under impulse of wool tariff, maintaining an almost undisputed ascendancy for about fifteen years 1824

Mousselines de laine made of fine wool for printing, introduced at Troixville, France 1826

The invention of William Golding, dispensing with the billy and obtaining the endless roll, patented 1826

The first conception of processes as now used for making felt cloth made by George G. Bishop, of Norwalk, Conn., in . . . 1827

Patent issued in 1829, under which felt carpeting and cloth were made of single width. A second patent was issued in 1836, under which the Union Manufacturing Company was organized at Norwalk in 1836. Machinery enlarged to make broadcloth in 1844. The French writers admit these American inventions to be the source of all the felt cloth and carpeting now made in the world.

John Ellman, of Glynde, the improver of the Down sheep, who had devoted more than half a century to his improvements, retired from business in 1829

The knitting-frame first operated by power at Cohoes, New York, by Egbert Egberts 1832

Mousseline de laine with cotton warps, introduced in France 1833

Fancy cassimeres invented by Bonjean at Sedan, France . 1834

A machine for burring wool successfully used by Michael H. Simpson, of Boston, Massachusetts 1834

Dommet flannels introduced by James Johnson, of Boston, in 1835

Flocks first introduced for backing satinets and other cloths, by John Rankin, of Troy, New York 1837

The first fancy cassimeres woven by power in the world made at the Middlesex Mills, at the suggestion of Samuel Lawrence, on loom invented by George Crompton 1840

The manufacture of shoddy, first undertaken on a grand scale at Batley, Yorkshire 1840

Automatic weaving of ingrain carpets invented by E. B. Bigelow, of Boston 1842

Fancy cassimeres first made by Edward Harris in 1842

First patent for machinery for removing burrs and foreign substances from wool granted to S. R. Parkhurst, of Newark, New Jersey 1845

The mechanical comber for drawing out the fibre at both ends of the lock of fibrous material, patented by Joshua Heilman, of France	1845
Bay State shawls introduced by the Bay State Mills (now Washington Mills), Lawrence, Massachusetts, M. D. Ross, Agent	1848
Silesian merinos introduced in United States by William Chamberlain	1851
Circular knitting-machine invented by John Pepper	1851
The first Mousselines de laine made at the Pacific Mills, Lawrence, Massachusetts	1853
Wool-comber used for carpet-wools invented by Michael H. Simpson	1854
Impulse given to the worsted industry of the United States by the Reciprocity Treaty of	1854
Aniline dyes introduced commercially by Perkins in	1857
Plain bareges for printing, introduced	1858
Fine indigo blue flannel coatings introduced by Bay State Mills (now Washington), G. V. Fox, Agent, in	1859
Worsted braids first made in United States in	1860
Moscows, after the German style, introduced by the Burlington Woollen Company, Winooski Falls, Vermont	1863
National Association of Wool Manufacturers founded	1864
National Wool Growers' Association founded	1865
Alliance between the Wool Growers and Wool Manufacturers of United States established at Syracuse Convention of December 13	1865
Buntings successfully made and largely introduced by the United States Bunting Company at Lowell, Massachusetts	1865
Wool and woollen tariff founded on joint recommendation of wool growers and wool manufacturers	1867
Cheviot coatings introduced by Washington Mills, Lawrence, Massachusetts, W. H. Salisbury, Agent	1867
Moquette carpets made by original machinery exhibited at the American Institute, by the inventor and manufacturer, Alexander Smith, in	1869
Value of all products of the woollen manufacture in the United States, exclusive of worsted carpets and hosiery, according to census of	1870
\$155,495,358. Value by same census of worsted products, \$22,000,331; carpets, \$21,761,573; hosiery, including cotton, \$18,411,564. Value of product of woollen manufacture, by	

census of 1860, \$61,805,986; by census of 1850, \$43,207,343; by census of 1840, \$20,696,999.

Worsted coatings introduced by Washington Mills, Lawrence, Massachusetts, W. H. Salisbury, Agent 1870

Extra ten per cent duty on wool, the product of countries east of the Cape of Good Hope, when imported from countries west of the Cape of Good Hope, taken off, in 1872

Ten per cent reduction of duties on wool and woollens made by act of 1872

THE BASSETT AND JOHNSON SELF-OPERATING WOOLLEN MULE.

WE can hardly realize that nearly all the great inventions in the textile manufacture of our times, have been made within a little more than a century. In 1760, the spinning-wheel and the common loom, as used by the people of Yorkshire, were little in advance of the implements for the same purpose which had been in use beyond the reach of history. Brompton's invention of the mule-jenny did not occur till 1787; and even the mule was hardly in use in the woollen mills of this country ten years ago. They are now coming into general use with American improvements suited to our system of manufacture. The self-operating woollen mules constructed by Messrs. Johnson and Bassett are receiving especial commendation. No better proof can be given of their excellence, even as compared with the celebrated Tatham mule, than their adoption by such eminent establishments as the Germania Mills, the Manchester Company, and Slater Woollen Company.

IMPROVED COTTON CARD.

WE have seen at the Merrimack Mills, Lowell, a cotton card, which has been in operation four months, without delay or repairs, and for which the following merits are claimed by the inventor, and, as we are informed by the superintendent, are substantiated by the work of the machine.

The new card will do double the work of the old machines. It occupies the same floor room, uses but one-fifth additional power, employs the same labor, does its work better, and gives a finer product.

While in weaving, spinning, &c., great improvements have been made in the past twenty-five years, in carding there has been but little advance. This invention is a long step in the right direction.



THE DOUBLE AND TREBLE DUTY ON WASHED AND SCOURED WOOL.

In our last number we published a letter from the Secretary of the Treasury declaring that the Department proposed to acquiesce in the decision of the Circuit Court for the Eastern District of New York in the case of DeForest against Arthur, Jan. 22, 1874, defining the meaning of the words in the Statutes imposing duty on "wools of the first class, washed," and that the Department would inform the customs officers accordingly.

It appears that by some inadvertence there was a delay in making this announcement to the customs officers, and that, although the Department intended to make a decision, it was not actually made on the 18th of February. We have since received a communication from the Treasury Department giving the information that a law passed on the 4th of March, prohibited the Department from making any decision changing the rate of duty unless advised by the Attorney-General. In this case the Attorney-General had already given an opinion opposed to the intended action of the Department, and that, under the circumstances, the Department could not legally carry its formerly proposed action into effect.

We are informed, however, from other sources, that another suit has been commenced, in which there will be an opportunity to obtain a favorable opinion from the Attorney-General; and the means will be thus afforded for the correction of the evil which the Department, with the best intentions, unfortunately failed to cure.

Review.

SOCIAL SCIENCE AND NATIONAL ECONOMY.

By ROBERT ELLIS THOMPSON, M. A., *Professor of Social Science in the University of Pennsylvania.* Philadelphia: Porter and Coates, Publishers.

WE have rarely hailed a volume with so hearty a welcome as we have given to the work of Professor Thompson. The pages of the "Pennsylvania Monthly," of which admirable magazine Professor Thompson is editor, had prepared us to expect a work from his pen of sound philosophy, adorned by excellent scholarship. We were aware, too, of the atmosphere in which the author lives, not merely the healthy air which pervades the political economy of the Pennsylvania school, but the more directly inspiring atmosphere of association, influences, and resources which immediately surround the author. Professor Thompson is the Librarian of the University of Pennsylvania, and the custodian of the unequalled collection of works on Political Economy, Social Science, and Labor, collected by Stephen Colwell. No writer on Social Science at home or abroad has had at his command such library resources in this department. And the author's scholarship has made the works of all languages available to him. It was our privilege to know Mr. Colwell intimately, and we may be permitted to say, as the highest praise which we could give to Professor Thompson's volume, that Mr. Colwell, if living, would be satisfied with the work which his collections and influence have inspired.

The work of Mr. Thompson, which occupies only 400 pages, is in our judgment the most compact and at the same time readable statement of the doctrines of the national school of political economy. We are happy to learn from Professor Dunbar, Professor of Political Economy at Harvard University, who is eclectic in his views and teachings of political economy, that he proposes to adopt this volume as the text-book from which to illustrate the views of the protective or national school.

No characteristic of Professor Thompson's work has impressed us so much as the elevated plane from which he takes his views of the objects of political economy. He inquires at the outset whether the great ends of social improvement are to be accomplished by cosmopolitan ideas adapted to the mere possibilities of the world's

state in some future or utopian time, or by the nations which are the actual political agencies of our time. In his view and in that, as we conceive, of the best thinkers of the present day, the old terms distinguishing the schools of political economy must be abandoned, and the terms "national" and "cosmopolitan" must be adopted, as expressing the real difference in the views of political economy.

As a nationalist, or what was formerly called a protectionist, our author regards the nation as the first element in the development of society, and we select his chapter on this topic as illustrative of his work, and as a premise, which once adopted, leads necessarily to the most essential conclusions of the practical protectionists of America.

"THE DEVELOPMENT OF SOCIETY.—THE NATION.

"§ 18. 'Man is a political animal,' Aristotle tells us. His nature has not attained its perfection until he is associated with his fellows in an organized body politic. Whatever may be the historical *occasion* of the origin of the state, this fact of man's nature is the sufficient *cause*.

"The first type of society is the *family*. This, like the state, is a natural form. It is a relationship not constituted by a reflective act of its constituent parts. No man has a choice as to whether he will or will not be born into a family, though he may by his own act cease to belong to it. Like the state, the family has a moral personality and a distinct life. It is a whole which contains more than is contained in the parts as such; that is, it is an organism, not an accretion.

"§ 19. The family expanded into the *tribe*. Related or neighboring families held or drawn together by natural affection or neighborly good feeling, or a sense of the need of union for the common defence, but chiefly by the political needs and instincts of their nature, formed an organic whole. By the legal fiction of adoption, all were regarded as members of one family and children of the common patriarch, living or dead. The reverence for the common father whose name they bore became a hero-worship, and bound them together by religious ties. Their living head or chief was regarded as inspired with judgment to pronounce upon disputed cases, which gradually gave rise to a body of judicial rules or laws revered as of divine authority.

"§ 20. The tribe became—though not always—a city. A hill-fort thrown up for defence against some sudden attack became the rallying-point and then the residence of its people. The conquest or adoption of other tribes added to their numbers and strength, and their home was enclosed by a wall capable of defence. The tribal gods or the first citizens obtained general recognition as the defenders of the city, but those of the new-comers were still worshipped by the clans. The first and the adopted tribes took the place of power, claiming to be 'the people,' and forming an aristocracy

who possessed exclusive knowledge of the laws and religion of the city. Only after prolonged struggle were these published in a code, and places of responsibility opened to the new citizens or *plebs*.

"§ 21. By the conquest of other cities, the city in some cases attained an imperial rank. In other cases a number of cities freely united in a league of offence and defence, and ceded their power to make war to a central congress, and established a common treasury. Both movements are in the direction of the nation, the complete form of the state, as the tribe and the city are incomplete forms. The nation is scarcely found in ancient history, save, perhaps, among the Jews and the Egyptians, and even among them the tribal divisions perpetuated themselves within the national unity.

"§ 22. The nation in its true form first appears in the kingdoms founded in Western Europe by the Teutonic tribes, after the destruction of the Roman Empire. The Teuton hated cities and loved the open country. When he spared a city he generally left it to its old occupants and made them his tributaries. He divided the open country into *marks* or communes, whose occupants were actually or by adoption members of one family-clan and bore the same name. Several of these were gathered by force of the political instinct into 'hundreds,' hundreds into 'shires,' and shires into kingdoms. Over each of these subdivisions an elder, alderman, or chief presided. In this way the race passed from the tribal to the national constitution, without developing the vigorous municipal life that had previously thwarted all attempts at establishing any larger body politic than the city, except a military, imperial despotism.

"Within the Teutonic mark towns grew up by the same process as in the ancient world, and the antipathy of the race to the town life wore off. But before these new municipalities were powerful enough to hinder the national growth, the nation had become an established fact. A second enemy of the national unity was the feudal system, which conferred large powers upon the local barons, in countries that had been conquered rather than occupied. Everywhere save in Germany itself the joint efforts of the king and the people overthrew this local power, and made the central government supreme. Thus the national consciousness superseded all other political attachments.

"§ 23. The nation is the normal type of the modern state, as the city was that of ancient society, and the tribe that of the prehistoric times. Besides many inaccurate definitions of its nature, several that deserve our notice have been given from different stand-points.

"(1.) Geographically the nation is a people speaking one language, living under one government, and occupying a continuous area. This area is a district whose natural boundaries designate it as intended for the site of an independent people.

"No one point of this definition is essential, save the second.

"(2.) Politically the nation is an organization of the whole people for the purposes of mutual defence from outside interference and of doing jus-

tice among themselves. It is a people who 'will to be one' in a body politic, for the purpose of realizing and making positive those natural rights which inhere in man's nature.

"(3.) Ethically the nation is a moral personality vested with responsibility and authority, and endowed with a life peculiar to itself, i.e., not possessed by the parts as individuals.

"§ 24. All these notions, and others besides, are elements of the historical conception of the nation. The historical nation is an organism, a political body, animated by a life of its own. It embraces not one generation but many, the dead and the unborn as well as the living. It contemplates its own perpetuity, making self-preservation the first law, and being incapable of providing for its own death or dissolution. There is in its own nature no reason why it should ever cease to exist, and the analogies often drawn from the life and death of the individual man are fallacious. The end of the nation is its own perfection; towards that it tends by a continual progress to a larger and freer life. Thus in its laws it continually aims to make political rights more and more the realization of natural right. In its gradual or sudden modifications of the form of government, it tends to make it more and more the exponent of the wants and the powers of the governed. Industrially it continually aims to develop the resources of its soil and the activities of its people, until they become in all necessary things independent and self-sufficient.

"§ 25. The nation as a moral personality must have had the same ultimate origin as other moral personalities, whether we conceive of it as the direct creation of God or as the work of His creatures. The traditions of all ancient cities with which we are acquainted, point to the first of these alternatives; that is, to a divine origin of their unity and their laws; and no one who believes in the continual government of the world by the Divine Will can doubt that nations exist in consequence of that will. 'He setteth the solitary in families. . . . He fixeth the bounds of the nations.' Then national laws are authoritative because they set forth that will, though its agency be concealed by reason of its working through and by the will of man. Hence the right of the nation over the lives and persons, as well as the possessions, of its members. It has a delegated authority from the Giver of life.

"§ 26. The state is either the creature of God, with authority limited because delegated, or is an uncreated entity with authority unlimited because original. In the latter case it can confess none of its acts to be wrongful, since it owns no law or morality above or beyond its own will. It must punish all appeals to 'the higher law' as treasonable. The atheistic theory of the state thus necessarily leads to the despot's construction of its powers. Those who hold it have generally been in modern times, by a happy inconsistency, on the liberal side in politics, but when they attain to power, the logic of their possession must lead them on to despotic measures. The only lasting and inviolable guarantee of personal freedom is in the doctrine of the state's divine origin and authority, though even this doctrine may be

abused to serve the purpose of despots, when the state is conceived as constructed *ab extra* by the imposition of a government by a divine authority from without. But the doctrine of the Old Testament is that the state is constituted through the people themselves being drawn into national unity, and that the government is the result and exponent of this fact. The governor, as the word originally signified, is the steersman of the vessel, giving direction to its course. But it is not his function to furnish the moving force of the ship of state. That is furnished by the vital force of the whole body politic.

"§ 27. As God made the state, he had a purpose in making it, a purpose which includes some elements common to all states and others that are peculiar to the particular state. Each state, like each man, has a calling, a vocation. Every nation is an elect or chosen people. It has a peculiar part to play in the moral order of the world. When it recognizes this purpose, it is, in Hebrew phrase, a people in covenant with God. The leading purpose of the Old Testament is to set forth the manner of such a national life, and the moral laws that govern it. It gives the essential features of such a life, in connection with some that are peculiar to the Jewish nation.

"§ 28. The universal element in the vocation of a state, is expressed in the statement that it is the institution of rights. This differentiates it from the family, which is the institution of the affections; also from mankind at large, as rights are realized and made positive through the existence of the state. Justice or righteousness, Plato discovered, is of the essence of the state. It can, therefore, attain to the purpose of its vocation only by complying with the ideal of justice as apprehended by the national conscience, — an ideal ever advancing in clearness and completeness as the nation tries to realize it. At the first this ideal requires only the righteous treatment of its own citizens as alone invested with the rights it recognizes. Afterwards men are brought by analogy to feel that as the state judges between man and man, God is judging between nation and nation. Hence originates a body of law between the nations.

"If justice be of the essence of the state, any wilful and conscious violation of it, i.e., any national unrighteousness that does not spring from and find its palliation in a low ideal of righteousness, must be a blow at the national life and existence. It must weaken the bonds which bind men to one another. Hence to plead the necessity of the national life as the excuse for such acts, is to plead that the state can only be saved by being destroyed. A state that has ceased to aim at righteousness has given up its *raison d'être*, and is a practical contradiction. It has ceased to be a body politic, and has become a band of pirates.

"§ 29. Justice has two aspects. (1) It is the state's function to do justice upon evil-doers within (and sometimes without) its own boundaries, by punishing them for past and deterring them from future invasions of the rights of others. (2) It is also called upon to *do itself justice*; that is, to secure the fullest and freest development of the national life in all worthy directions. As self-preservation is its first duty, there is involved in that

duty this obligation, — to progress in national life. ‘The end of the state is not only to live, but to live nobly.’

“§ 30. In the order of nature, progress is attained through the differentiation of the parts of a living organism from each other and from the whole. ‘The higher a living being stands in the order of nature, the greater the difference between its parts, and between each part of the whole organism. The lower the organism, the less the difference between the parts, and between each part and the whole.’ (Goethe.)

“‘The investigations of Wolff, Goethe, and Von Baer, have established the truth that the series of changes gone through during the development of a seed into a tree, or an ovum into an animal, constitute an advance from homogeneity of structure to heterogeneity of structure. . . . The first step is the appearance of a difference between two parts of its substance. . . . This law of organic progress is the law of all progress. Whether it be in the development of the earth, in the development of life upon its surface, in the development of Society, of Government, of Manufactures, of Commerce, of Language, Literature, Science, Art, — this same evolution of the single into the complex, through successive differentiations, holds throughout. From the earliest traceable cosmical changes down to the latest results of civilization [it] is that in which progress essentially consists. . . . As we see in existing barbarous tribes, society in its first and lowest forms is a homogeneous aggregation of individuals having like powers and like functions, the only marked difference of functions being that which accompanies difference of sex. Every man is warrior, hunter, fisherman, tool-maker, builder; every woman performs the same drudgeries; every family is self-sufficing, and, save for purposes of aggression and defence, might as well live apart from the rest.’ (Herbert Spencer.)

“See also, Coleridge’s *Idea of Life*. (Works, Vol. I., esp. p. 388.)

“This is true less of the spiritual than of the material side of the national life. It applies especially to those relations to nature, which are the theme of social science in the sense that we take it, — relations which come very directly under the action and control of natural laws (see § 2). As regards the higher or spiritual side of that life, each member of the perfect state is in some sense a reproduction of the whole body politic, — like it, a free moral personality.

“Yet the Apostle Paul applies this analogy of difference and interdependence to the most purely spiritual form of society. ‘The body is not one member but many, and all members have not the same office. . . . The eye cannot say to the hand, I have no need of thee.’

“§ 31. Every fully developed state is a complex form of life, whose elements may be distinguished as three. There is the industrial state, the jural state, and the culture-state. The second embraces the state’s political life, the people’s advance in freedom and social morality, and its development in legislation; the third is the sphere of intellectual movement, prog-

ress in the fine arts, in literature and the sciences. The first is the sphere of the material well-being of the people. The full development of each of the three is essential to the highest well-being of the whole body politic.

“ § 32. In seeking the full and free development of the national life on all its sides as its chief end, the state cannot be charged with selfishness. The affections and the attachments of finite beings are of necessity circumscribed, that they may be intense, vigorous, and healthy. In the family life we should count the man immoral who loved other men's wives as he loved his own; unnatural if he had no more affection for his own children than for those of other men. To ‘provide for his own, especially for them that are of his own house,’ is one of the first duties of the head or the member of a nation as well as of a household.

“ While acting first of all for the interest of his own nation, he is not bound to seek to injure or cramp the natural development of other nations. He can quite consistently cherish the warmest desires for the welfare of every other national household, and scrupulously avoid any act that would interfere with it. The more strong and hearty and pure the attachment he feels towards his own nation, the more likely he is to sympathize with the patriotic citizens of other nations. The late F. D. Maurice well says: ‘If I, being an Englishman, desire to be thoroughly an Englishman, I must respect every Frenchman who desires to be thoroughly a Frenchman, every German who strives to be thoroughly a German. I must learn more of the grandeur and worth of his position, the more I estimate the worth and grandeur of my own. . . . Parting with our distinctive characteristics, we become useless to each other, — we run in each other's way; neither brings in his quota to the common treasure of humanity.’

“ Those who cherish the enthusiasm that men feel for their own nation, as ethically right, do not necessarily repudiate ‘the enthusiasm of humanity.’ They may very well recognize its value and dignity, while feeling that it belongs to another sphere than either the jural or industrial state. There is another kingdom, ‘not of this world’ or order, in which ‘there is neither Jew nor Greek,’ founded by him who awakened the sense of human brotherhood in the hearts of men.

“ § 33. The industrial state contains three great fundamental classes, — the agricultural, the commercial, and the manufacturing. A nation takes high rank industrially in proportion as all the three are fully developed and exist in equilibrium. If any one of the three is depressed or hindered in its development, the whole body politic suffers accordingly. The others may seem to prosper at its expense, but because the state is a living organism, and not a dead aggregate of individuals, one member cannot suffer, but all the members must suffer with it.

“ § 34. The individuality of the parts of an organism has its end in their interdependence and mutual helpfulness. A flock of animals, though ‘a collection of individuals,’ is not a whole made up of differentiated parts. It is only ‘a numerical extension of a single specimen.’ A mob of men is equally

deficient in true organic unity. It is united only by the existence of the same overmastering rage or lawlessness in each single individual, as animates the entire mob. A state is a body in which men have different functions as well as different personalities; in which each has his place of service to the whole body. The greater and more marked the variety of the parts, the more closely the whole body is bound in an effective unity. The nation takes a low rank industrially whose members are not employed chiefly in serving one another, but in serving the members of other nationalities.

"§ 35. All history illustrates the principle that the chief growth of the state is from within. Nations have often imparted to each other wholesome and stimulating impulses, but beyond a certain limit foreign influence has always been a hinderance, and has been jealously resented by the wise instincts of the people. We see this in the history of art, literature, language, law, and political institutions, and every other side of the national life.

"Any plan of human life, any project for human improvement, which, either in the interest of imperial ambition or of cosmopolitan philanthropy, ignores the existence of the nations as parts of the world's providential order, can work only mischief and confusion."

The importance of these views as a groundwork for any system of political economy which can be accepted by an American patriot, is evident when it is remembered, that with the cosmopolitan or free-trader such considerations have no place. Their arguments are never based on the necessities of a national life. With Cobden, they would gladly see all boundary-lines wiped from the map; and, like him, they regard nations as necessary evils.

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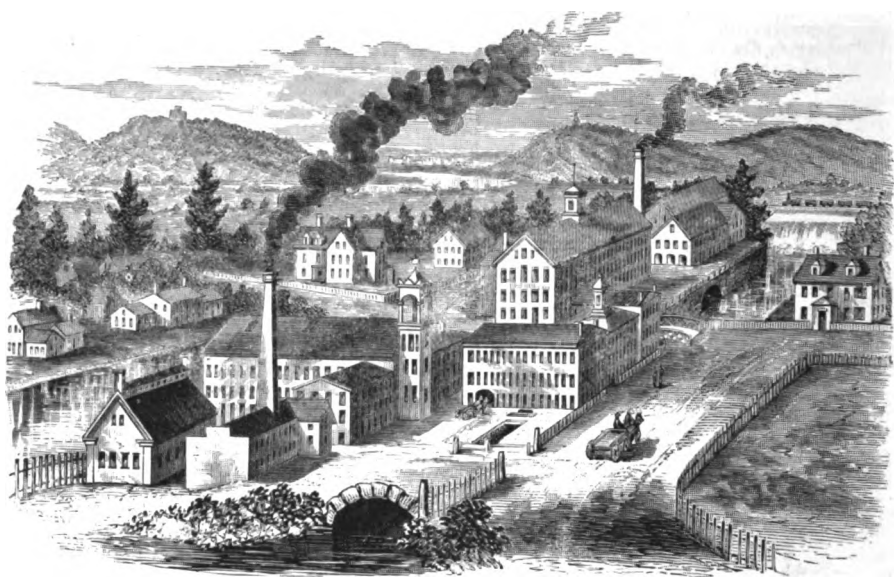
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- III.
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- IV.
JOINT REPORT OF THE EXECUTIVE COMMITTEE of the National Association of Wool Manufacturers, and of the Executive Committee of the National Wool-Growers' Association, addressed to the United States Revenue Commission, Feb. 9, 1866. 23 pp.
- V.
STATEMENT OF FACTS RELATIVE TO CANADA WOOLS AND THE MANUFACTURES OF WORSTED. 21 pp.
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BULLETIN OF THE NATIONAL ASSOCIATION OF WOOL MANUFACTURERS. January, 1869. Vol. I., Nos. 1, 2, and 4. Vol. II., Nos. 1, 2, 3, 4, 5, 6, and 7. Vol. III., Nos. 1, 2, 3, and 4. Vol. IV., Nos. 1, 2, 3, and 4. Vol. V., No. 1, and 2.
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- XXI.
SPEECHES, ADDRESSES, AND LETTERS ON INDUSTRIAL AND FINANCIAL QUESTIONS. By William D. Kelley, M. C. 514 pp. In cloth.
- XXII.
NOTES UPON INDIGO. By John L. Hayes. 79 pp. Bound in cloth, \$1.00; in paper, 50 cents.

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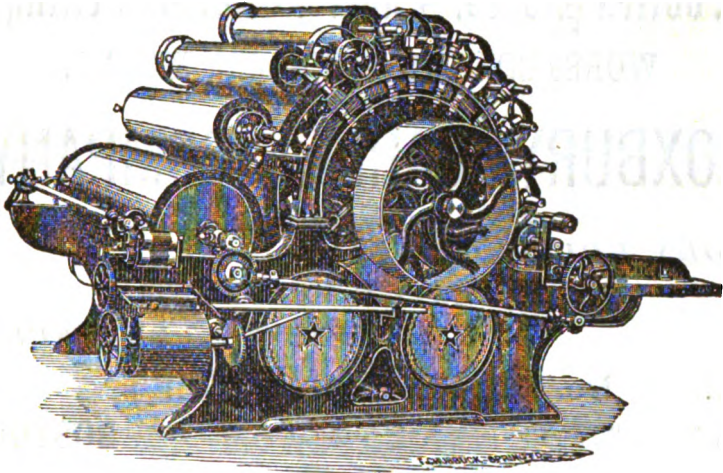
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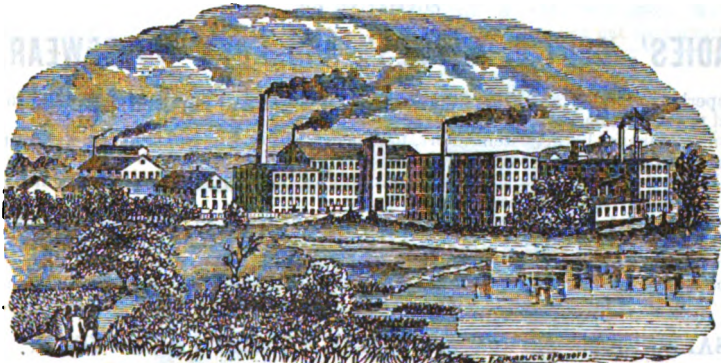


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ANILINE DYES.

Having reliable and experienced Correspondents in Europe and Australia,
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WOOL AND GENERAL MERCHANDISE

To order, upon the most favorable terms.

To Woollen and Cotton Manufacturers.

WARRANTED INDIGO BLUE.

New Process for Dyeing Wool, Cloth, and Yarn, with Indigo, producing a Fast Color with our

PATENT INDIGO BLUE DYE.

Can produce any shade of Blue, from the deepest army to very lightest tint, all from same vat in one day; can't lose a vat.

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Messrs. Jerome Marble & Co.,—Gentlemen: We take pleasure in saying that, having used your "Patent Indigo Blue Dye" for the last three months, it has given us entire satisfaction, fully equal in color and quite as cheap as our Wood Vat, besides being able to do a very much larger amount of work per day than by the old process, and I would cheerfully recommend it to manufacturers using Indigo.

Respectfully yours, R. R. SAFFORD, Superintendent Royalston Woollen Mills.

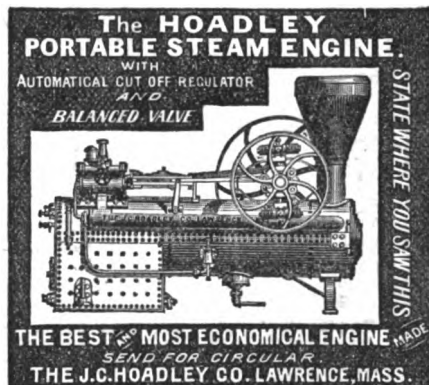
I fully indorse all my Superintendent has said in regard to the Patent Indigo Blue Dye.

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The Royalston Woollen Mills make a specialty of dark blues for coatings and military goods. For further particulars and testimonials, address

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All parties infringing on our rights will be dealt with according to law. Look out for Imitations.



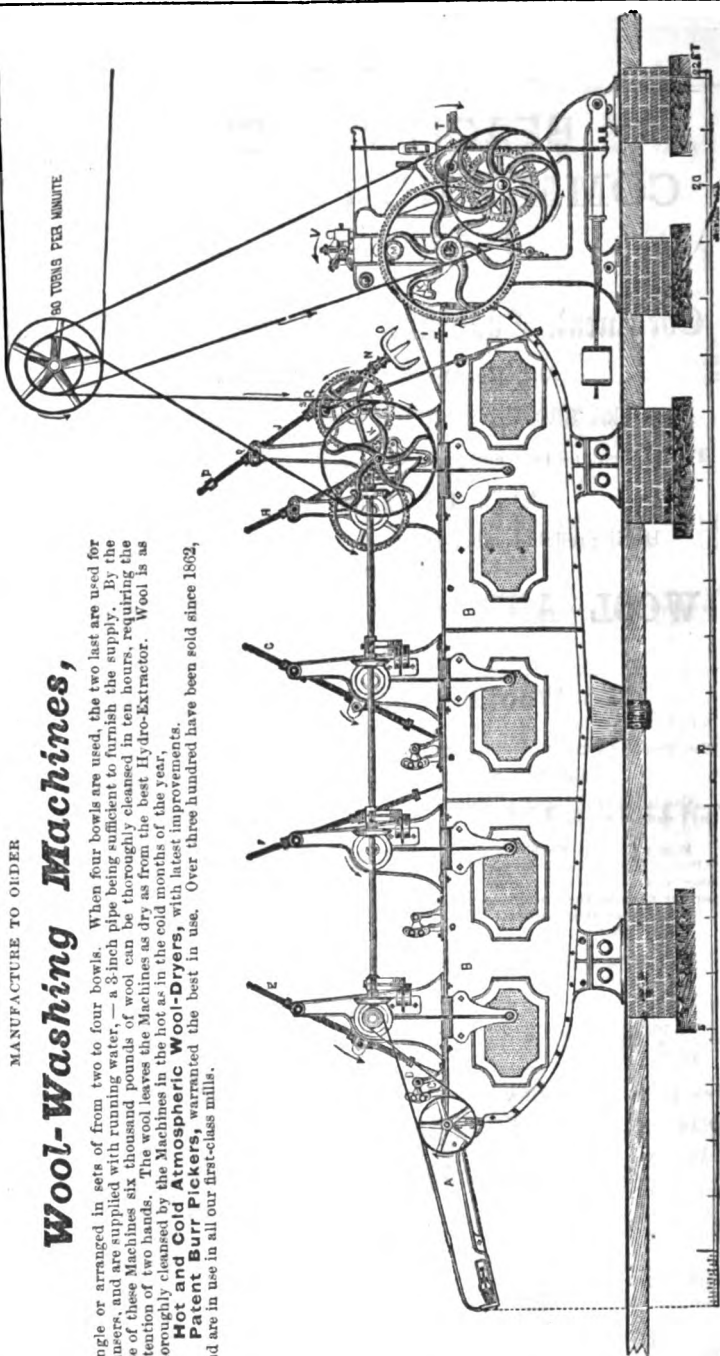
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Wool-Washing Machines,

Single or arranged in sets of from two to four bowls. When four bowls are used, the two last are used for Runners, and are supplied with running water, — a 3-inch pipe being sufficient to furnish the supply. By the use of these Machines six thousand pounds of wool can be thoroughly cleaned in ten hours, requiring the attention of two hands. The wool leaves the Machines as dry as from the best Hydro-Extractor. Wool is as thoroughly cleaned by the Machines in the hot as in the cold months of the year.

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Burring Machines for Cards, with Lumpers attached, which thoroughly opens the wool before it reaches the Card.

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Machines for Burring Wool on Pelts.

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A large assortment constantly on hand. Cotton Ropes, Clothes Lines, Sash Cords of any size, length, twist, or weight. Also, Cotton Yarns, Batts, &c. And dealers in all kinds of Cotton Waste, Paper, Paper Stock, and Manufacturers' Supplies. Commission Merchants and Manufacturers' Agents.

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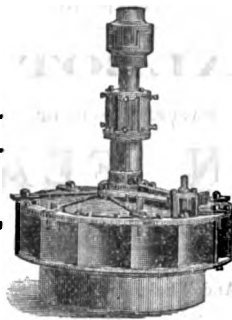
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It gives steady power, and is economical.



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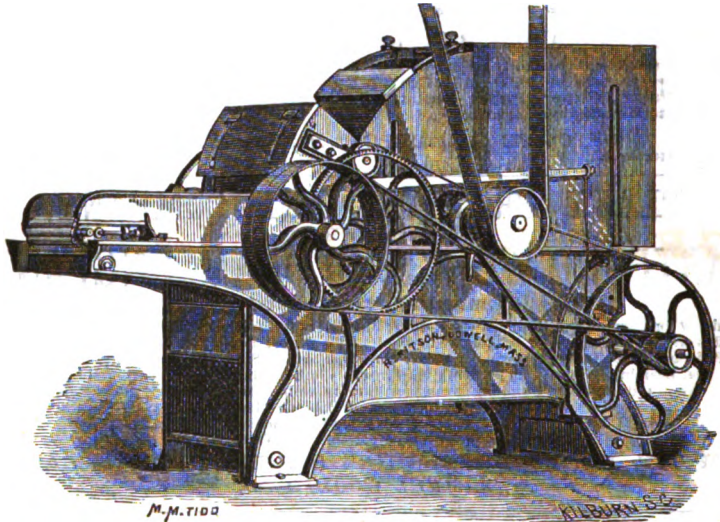
EVERY WHEEL WARRANTED.

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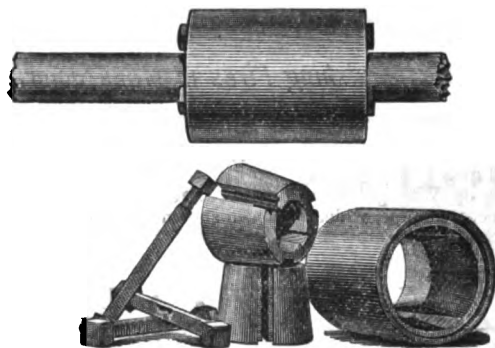
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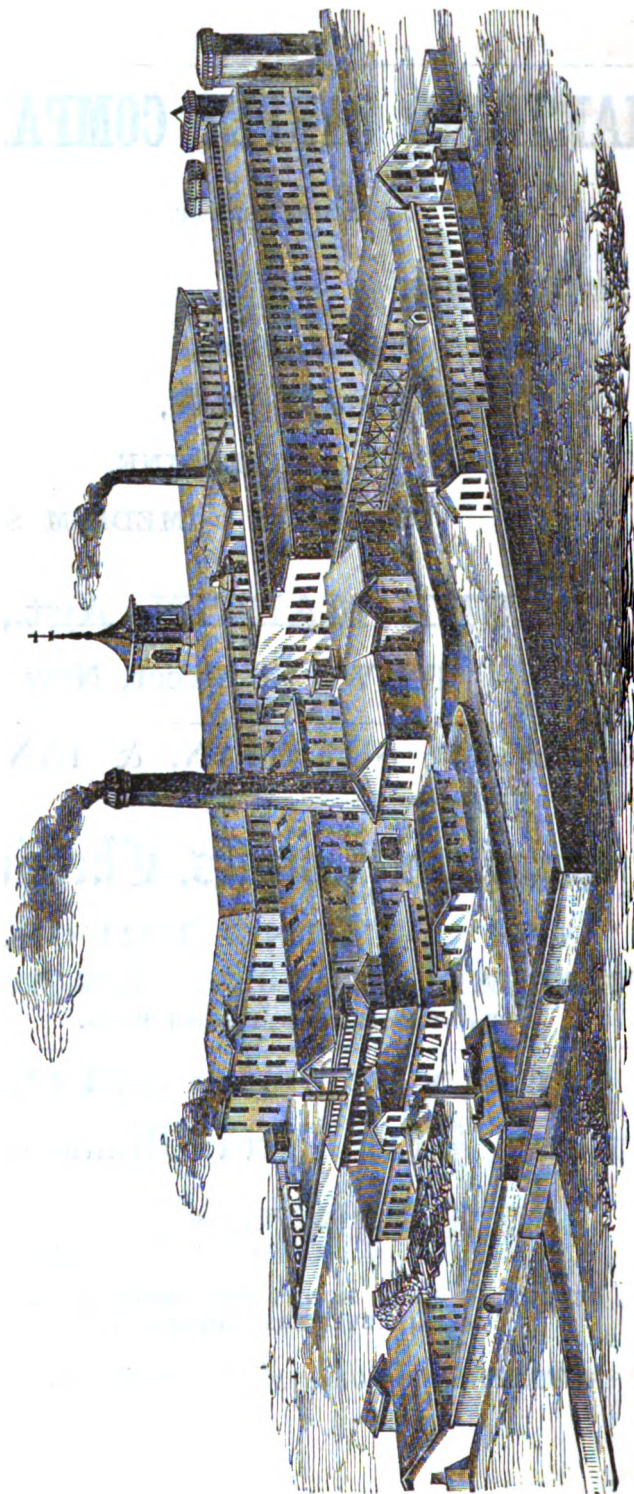
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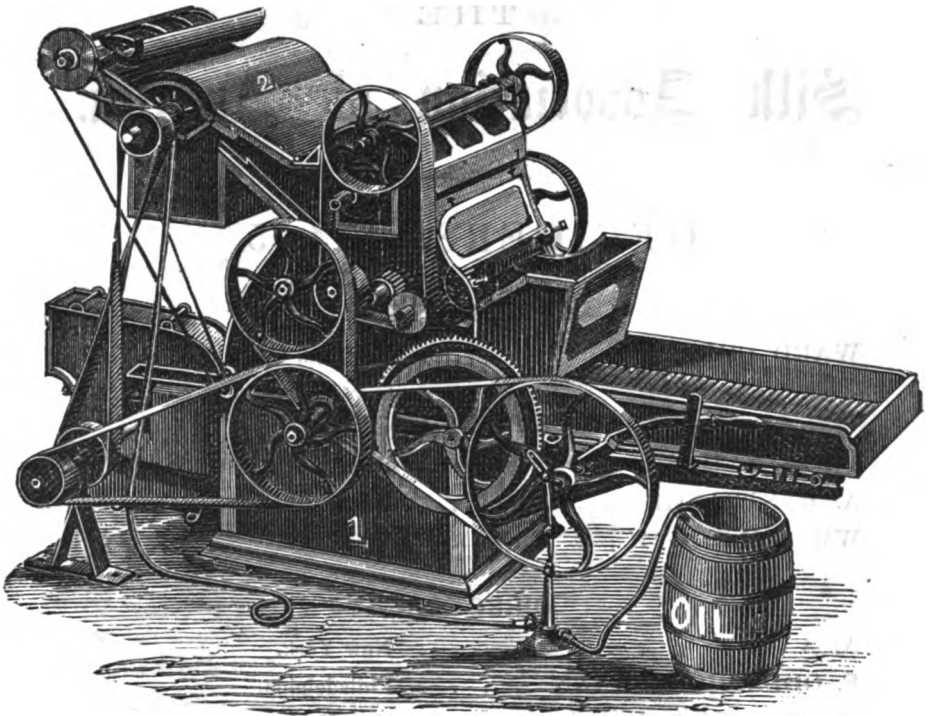
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PARKHURST'S PATENT DOUBLE CYLINDER BURRING PICKERS,

For Picking, Burring, and Dusting all grades and qualities of Wool. Recent improvements, including a beater attached to the spout, for the purpose of more thoroughly mixing and cleaning the wool; attached to this is an improved Oiler, for the purpose of oiling the wool. Wool running once through the Picker is dusted, burred, and picked, ready for the cards, making a saving of labor and power; the wool is prepared better, and is more evenly oiled and picked, than by any other process in use. (See No. 2.)

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PATENT STEEL-RING DOUBLE BURRING MACHINES,

With patent Steel-ring Feed Rollers, applied to Carding Machines.

No. 4.

STEEL-RING SINGLE BURRING MACHINES,

Applied to First Breakers of Carding Machines.

FINE STEEL-RING BURRING MACHINES,

Applied to Second Breakers and Finishers of Carding Machines.

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Applied to Single Burring Machines, Second Breakers and Finishers of Carding Machines. Patents granted June 17, 1862, March 13, 1865, July 24, 1868, January 11, 1870.

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(Double and Single) for all kinds of hard and soft twisted Yarns worked up. Superior to all other Machines now in use, and for about half the price of the imported ones.

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UNITED STATES Textile Manufacturers' Directory,

COMPRISING

Woollen, Cotton, Silk, Jute, Flax, Linen, and Paper Establishments,
and Iron and Steel Works in the United States,

For 1875.

This work contains a list of all the above-named manufacturers in this country, description of each Mill, with names of Treasurers, Resident Agents, and Superintendents; kind of Goods manufactured, with extent of Machinery, names of Selling Agents, &c. Arranged in separate departments, as follows:—

Wool and Woollen Department contains a list of WOOL DEALERS in the principal Wool Markets in the United States; WOOLEN MANUFACTURERS, with capacity of Mill; WOOL CARDERS, SHODDY MANUFACTURERS, &c.

Cotton Department contains a list of COTTON DEALERS in the principal Cotton Markets; COTTON MANUFACTURERS, with capacity of Mill; THREAD, LINE, AND TWINE MANUFACTURERS and PRINT WORKS.

Silk Department, comprising list of DEALERS IN RAW SILK, IMPORTERS, &c.; SILK MANUFACTURERS, with description of Goods made, Agencies, &c. Prepared by the Secretary of the Silk Association of America, specially for this work.

Jute, Flax, and Linen Department. Devoted to these industries.

Dry Goods Department. List of Dry-Goods Commission Houses, Offices, and Agencies of Manufacturing Companies in the principal Cities.

Statistical Department. Devoted to Woollen, Cotton, Silk, Jute, Flax, and Linen Statistics of the United States.

Paper Department. List of Dealers in Paper Stock, Paper Warehouses, and Paper Manufacturers, with description of Mills, kind of Goods manufactured, &c., &c.

Iron and Steel Department, comprising list of Furnaces, Rolling Mills, Steel Works, Forges, and Bloomaries in every State, with valuable statistical matter. Prepared by the Secretary of the American Iron and Steel Association.

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In every form, adapted to Mechanical Purposes.

COMPRISING :

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Patent "Smooth Bore" Rubber Suction Hose.

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Antiseptic Linen Hose, a cheap and durable Hose for mill and factory purposes.

Antiseptic Rubber-lined Linen Hose, the lightest Hose manufactured for use on Hand or Steam Fire Engines. Will stand a pressure of 800 lbs. per sq. in.

Car Springs of a superior quality, and of all the various sizes used.

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Price Lists and further information may be obtained by mail or otherwise on application.

HERTLE & THOMPSON,

Patentees and Sole Manufacturers of their

Patent Machine Wire Heddles,

For Woollen, Cotton, and Silk.

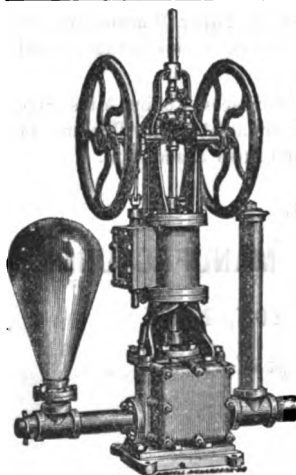
Warranted not to catch the Warp Thread in the Eye.

Patented July 14, 1868, and April 19, 1870.

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Genuine Crompton Loom,
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OF

WOOL MANUFACTURERS,

FOUNDED NOV. 30, 1864.

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VOL. V.]

[No. 6.]

BULLETIN *30.80*

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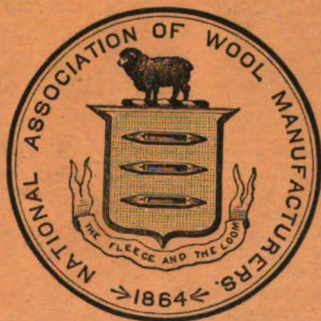
National Association

OF

WOOL MANUFACTURERS.

FOUNDED NOV. 30, 1864.

1875.



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EDITED BY JOHN L. HAYES.

BOSTON:

OFFICE, 11 PEMBERTON SQUARE.

1875.

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1875. Oct. 13,
John L. Hayes
& Lamirage
BULLETIN

OF THE

National Association of Wool Manufacturers.

VOL. V.] BOSTON, JULY—SEPTEMBER, 1875. [No. VI.

WOOL-GROWING IN THE UNITED STATES.

BY GEORGE GEDDES.

PREFATORY NOTE.

THE following paper was written at the request of Mr. John L. Hayes, editor of "The Bulletin," which is the official organ of the National Association of Wool Manufacturers. The request of Mr. Hayes was accompanied with the declaration that the manufacturing interests desired an elaborate discussion of the present condition and future prospects of the business of wool-growing in the United States, from some person who had such important pecuniary interests in the business as to make the subject one of great interest to him. I have undertaken the work, only insisting that my views should first be made public through the medium of "The Tribune," which has for so long a time allowed me through its columns to address the farmers of the country.

GEORGE GEDDES.*

FAIRMOUNT, N. Y., Sept. 6, 1875.

The United States, as a nation, has reached that stage of industrial progress in which each branch is rapidly assuming a fixed character. Capital has so accumulated that there is abundance to develop and put into active employment the great resources

* Our readers need scarcely to be informed that no person in the country is accepted as higher authority as an agricultural writer and practical farmer than the writer of this article. — ED.

that exist in the soil and in the mines that are under it; and natural lines of water communication, opening the way and pointing out the creation of artificial lines, not only of water but of land transportation, give the means of a more rapid creation of wealth and national resources than have ever before been combined in a climate suited to the highest and best physical and mental condition of men.

The century that has passed, since our nationality was established, has been marked by a progress in bringing into use the vast resources of this wonderful country that has had no parallel in all time, and now we see the various forces that are all around adjusting themselves into harmonious and united action. The forests have been removed, the mines have been opened, the means of transportation have been provided, capital in great abundance lies in the banks unemployed, and only confidence is wanted to cause it to seek enterprises that shall make it profitable. The agriculture of the country is guided by the most energetic and intelligent body of men that were ever charged with providing the food for a great nation. Nothing, it would seem, but the unwise national legislation can prevent in the immediate future the most wonderful progress and advance of all our great interests. If our existing laws protecting our partially established industries can but be permitted to remain as they now are, a very short time must suffice to so educate our artisans and give us skilled labor as to make the future secure, even against such follies of legislation as we have witnessed in the past.

That great statesman, Alexander Hamilton, said: "When all the kinds of industry obtain in a community, each individual can find his proper element and can call into activity the whole vigor of his character;" and it is only by promoting "all the kinds of industry" that each branch can be made most really prosperous. Though agriculture may truly be said to stand as the foundation of all prosperity, yet when all the people of a nation are devoting their labors to the production of food and the raw material for clothing, the nation must be poor in peace and weak in war, unless it can maintain permanent relations of

perfect friendship with some other peoples, who are as dependent for food as would the exclusively agricultural people be for manufactured articles. National independence itself depends for its existence on a diversified industry that shall in times of peace accumulate resources that shall be adequate to enable extraordinary efforts to be put forth in the emergencies of war; and so diversified must the productions of a nation be that, if required, it can within itself not only carry on war with other nations, but strike blows in which are concentrated all the momentum that is due to the best joint and simultaneous action of all its energies, none of them being left latent and unused, but all in action at once.

If any nation can within itself furnish all the vast material that war's consumption demands, and then keep in active operation all its industries, and keep open all its lines of internal commerce, it may lose entirely all its foreign commerce and still be unconquerable; but if it is dependent for any one absolute essential of war upon some foreign power that may at any hour become hostile, by just so much is national independence deficient, and national safety demands that there should be no such deficiencies.

Applying these principles, we see that food for the people is the first thing that must be provided for, the next clothing. Any nation that cannot command supplies of both food and clothing from its home resources must by some very precarious means receive supplies from powers that may at will withhold them. England — though unable to produce its own food, or the raw material for its people's clothing — by its immense, and therefore low-priced capital, by its skilled labor, by its commercial power, and by its power in arms, and its selfish diplomacy, has sustained itself by being the workshop of the world, inducing one nation to give it food in exchange for manufactured articles, another to furnish the raw material to its looms, and take back the manufactured product at prices enhanced, perhaps, a hundred-fold. This vast fabric of English power revolves like a top upon a point, sustained by its own motion, but liable to a dreadful downfall whenever the time shall come that this most

artificial power shall be unable to shape the policy of other nations as well as its own.

In this matter England is no safe example for us to follow. We wish to pay our national debt, and to become so strong, by the bringing into use the powers which we have in our own favored country, that national debts will never again be with us a necessity. We do not wish to sustain dependent colonies by force of vast armies and fleets, that we may wring from the dependent people the means of paying for such establishments. Nor do we wish to so cut down the price of labor at home, in order to undersell all the world, as to fill the country with paupers receiving relief from public funds, or to send women into the iron mills, as they do in Wales, to perform the work belonging to men to do, and receiving "less than one-half the wages that would be paid to a man for the same labor." — "Bulletin Wool Manufacturers" for April, 1871, p. 389.

England being forced to pay for transporting so much of its food and raw material, for great distances from its place of production, to its own workshops, must force the pay of its laborers down far enough to compensate for this cost of transportation, in order to start even with manufacturers that live near the place of growth of the raw material and the food of the workman.

To state this as a question of labor, more hours will be required of human labor, to transport 1,000 pounds of wool from Australia to England, and there make it into cloth, and to transport breadstuffs from Illinois to the laborer in England, and meat from the Continent of Europe to feed that laborer, than it will to take 1,000 pounds of wool in the State of Illinois, where it was grown, and there, beside the wheat fields and the pastures that produce the bread and meat to feed the workmen, do the manufacturing.

This statement requires no strengthening: it is self-demonstrating. Inasmuch as a large proportion of the wool made into cloth in England, and a large portion of the food consumed there, must be brought from great distances, because a sufficient supply cannot be produced in England; and inasmuch as Illinois

produces wool and wheat and meat, more than can find consumers there, — just the facts of the case stated do exist : and thus cloth made in Illinois is cheaper in human labor, as measured by the hours required for its production, than the same cloth can be in England. To undersell the Illinois manufacturer at his own door, the English manufacturer must feed his labor less, or pay it less wages.

There is still another view of this matter of the cost of production, as measured by the hours of human labor necessary : "When we take into consideration the greater energy and intelligence of our better fed and better educated workmen, the necessary use of every labor-saving process, on account of the higher cost of labor here, and the admitted superiority of American machinery, it will be safe to assert that a yard of cloth is made in this country with less hours of human labor than one of equal quality and of the same degree of finish abroad." ("Bulletin" for April, 1871, p. 388.) This extract from so high an authority places the interests of home manufacturers on still stronger grounds than when we embrace the total cost of production of raw material, food for the artisan, and every other element of human labor. England has only the advantages of cheaper capital, skilled workmen, and perfect organization of both capital and labor, combined with the command of the foreign markets long established and accustomed to the purchase of English goods, and the power to extort more labor by reducing the laborer to starvation's door. Against these advantages our labor must be protected, or English capital already invested will continue to carry wool and food nearly around the globe, and still either undersell our labor or force down its compensation.

Acting and reasoning upon the assumption that the present tariff laws of this country will be continued for many years, it certainly must come to pass by and by, that the cloth worn not only in the State of Illinois, but all over our country, will be made of home-grown and home-manufactured wool.

Capital here is dearer than in England ; but if the manufacturer of cloth can buy the wool from which it is made at his mill

of the farmer, who lives near by, and sell it back to that farmer, the time during which the capital is employed is so short, that seven per cent interest can as well be paid in our country as the English manufacturer can pay three, and the commissions and profits of many middlemen. Thus the question of capital will in due time take care of itself. Every day in this country of ours, this approximation into immediate neighborhood of producer of material and manufacturer of it is going on, to the very great advantage of the wool-grower in enhanced prices for his wool, and to the wearer of the cloth in having it of better quality and free from the shoddy, mungo, and other things beside good wool, that the English manufacturer uses so abundantly in the fabrication of heavy, smooth-faced but rotten cloth. Illinois wool is better than South American wool, and Illinois manufacturers have not been forced, and will not be, into the use of shoddy and kindred frauds.

The uncertainties of Congressional action in regard to protection of our home industry, and our national policy generally, have been so great, that capital has only been induced to venture into the ever-changing currents by the occasional return to the policy of protection, when the nation's finances have been prostrated by opening our markets to foreign productions, that paralyzing our own industry, have broken all business down, until again revived under a policy of protection. With such return to the oft-proven remedy for bankruptcy, men have, from time to time, invested their money in the construction of mills for making woollen cloth. These mills, perhaps, have for a while been profitable to their owners: they were certain to be profitable to every other man, woman, and child living near them. With returning prosperity, the never-to-be-put-down cry of commercial men for such freedom as shall make the carrying of commodities more profitable than their production — having organization, money, non-producing professional men, and newspapers at command — fills the air, and sooner or later brings about the experiment so often tried with the same unfailing result, — hard times, depression of business, universal suspension, and repentance when too late.

In these times the unfortunate owners of mills suffer with the rest, but perhaps not more than do the very men who were so clamorous for freedom to buy where they could for the least money; for ships sometimes rot at the wharves when commerce is no longer sustained by agriculture and manufactures.

What good reasons have we for supposing that in the future our national legislation will be more wise and stable than it has been in the past? May we not look for a new revenue law as often as once a year, unsettling our industries, as we have had in the past?

Our hopes of more permanence and more wisdom in our future legislation are founded on the fact, that the wants of the nation for money to meet its expenses and pay its debts will force it to look to revenue from duties on manufactures imported into it, and that the incidental protection, which must result, will take care of the woollen interest unless they are unfairly discriminated against. The exact position that the woollen interests, both as regards the growing of wool and its manufacture, now hold is just here worthy of consideration, to determine their strength to resist unfair legislation that discriminates against them.

A very great change has taken place in the last fifteen years in the condition of the business of growing and that of manufacturing wool into cloth. Both branches have been immensely advanced. The production of wool in this country in 1860, under a policy of free trade that had lasted from 1846, was 60,511,343 pounds. In 1874, under a protective policy continued from 1861, it is estimated to have reached 178,000,000 pounds. The Pacific States produced in 1868, 15,000,000 pounds; in 1870, 23,000,000 pounds; and the estimates for 1875 are 39,000,000 pounds. Thus has sprung into gigantic dimensions a branch of industry that has with it a vast voting power.

Capital has been invested in the construction of woollen mills to make into cloth this rapidly increasing crop of wool, and much more than our growers have yet been able to produce. We have 10,126 sets of machinery distributed through every State from

Maine to Georgia, Oregon, and Massachusetts ; and it is estimated that we still import from other countries about ten per cent of the wool used in our own mills, — of woollen goods proper, not including carpets and worsteds.

These two interests, represented by the growers of wool and the manufacturers of it, — each a great power when organized and brought into action, — had, during all the years that preceded 1867, quite half a century, been in antagonistic positions. Sometimes legislation would recognize the interests of the growers of wool as entitled to protection ; at other times, it would be held that free trade in raw material is due to the manufacturer, that he might compete with cloth imported at low duties, or entirely free of duty. "The legislation in relation to this industry," says Mr. Bigelow, in his address at the American Institute, "vacillated as each interest predominated," and "unstableness and chronic weakness" became the settled condition of our wool industry.

Each of these interests well knew that in reality the other must be prosperous, or it must itself utterly fail. It would be idle to attempt to create and carry to a profitable result the business of wool growing, and look to a foreign market for purchasers. There must be a home market for our wool, or we must send it to England to there meet the fully matured and established industries of all the wool-producing countries. Against such competition we could not succeed in building up a great national industry. We must have mills near us to turn our wool into form to be consumed.

The manufacturers of wool equally well knew that it was entirely unsafe for them to invest their capital in a business that could only succeed by going far away for the raw material ; crossing seas, that in case of war might be swarming with hostile ships ready to seize their wool. Unless there could be some guarantee that our nation would never be engaged in war with a commercial nation, the hazards of war alone would render impossible the creation of so vast an industry as is required to furnish the woollen goods that we, as a people, should consume.

But aside from the hazards of war, there are causes at work which govern the buying and selling between nations, having no political interests in common, that, sooner or later, make one unduly dependent upon the other when it imports more than ten per cent of all it consumes. If importations of any one commodity greatly exceed this proportion, exportations of some other things must be made that shall restore the commercial balance. With us it is usually in the form of gold or bonds bearing interest that thereafter call for semi-annual drafts of our gold, and finally for payment of principal in gold.

Although these things were perfectly understood by a comparatively small number of thinking men among wool growers and wool manufacturers, yet the immediate interests of buyer and seller, making each anxious to receive his full proportion of compensation for what he did in providing the public with clothing, kept these really mutually dependent industries in constant antagonism, as has been said, for half a century in our country and a whole century in England. How this suicidal quarrel was terminated in England we do not care to investigate here; our own differences were terminated, and our interests brought into perfectly harmonious co-operation by the tariff of 1867. How that tariff came to be enacted is well worthy of our notice.

In the year 1864 a large number of the leading manufacturers of woollen goods met at Springfield, Mass. There were representatives from each of the New England States, from Ohio, Pennsylvania, New York, New Jersey, Maryland, and Delaware. The "National Association of Wool Manufacturers" was then and there formed. The Executive Committee of this body in 1865 invited the wool-growers' associations that had been formed in the States of New York, Vermont, Ohio, Illinois, Wisconsin, and the New England Association to meet the Manufacturers' Association at Syracuse, N. Y., on the thirteenth day of December of that year, "for the purpose of consultation in relation to their mutual interests, especially as to the representations to be given respecting the wool-producing and wool-manufacturing interests, before the United States Tariff and Revenue Commission."

These several Associations, strongly represented, duly met and organized by making President the Hon. Henry S. Randall, well known as a wool-grower, sheep-breeder, and as the leading writer of the day on sheep and wool growing, and who was the President of the New York Association of Wool Growers.

The proceedings of this joint Convention were marked by perfect freedom of discussion, and perfectly plain talk, and unanimous action followed. The important principle established is embraced in the following resolution : —

“ That as the two branches of agricultural and manufacturing industry represented by the woollen interests involve largely the labor of the country, whose productiveness is the basis of national prosperity, sound policy requires such legislative action as shall place them on an equal footing, and give them equal encouragement and protection in competing with the accumulated capital and low wages of other countries.”

This joint expression of what was believed to be the just basis of future joint action has been in good faith, and all its true spirit and intent faithfully carried out on the part of the Associations that were united in making it.

It was resolved to lay the resolutions and the reasons on which they were based, by the Executive Committees of the Associations, before the Revenue Commission and the appropriate committee in Congress, and this was done in the form of an act framed and agreed to by the several Executive Committees, which bill was accepted by the Ways and Means Committee of the House of Representatives, and by Congress passed into a law. Thus came the wool tariff of 1867.

At the time of the adoption of this tariff, wool was very much depressed in the market, and in anticipation of its passage large importations of foreign-grown wool were made. So that the law found the business of wool-growing at about its lowest ebb. At this period the surplus of the great over-production of wool of the Southern Hemisphere, which had been stimulated by the cotton famine, began to pour into our country. We cannot doubt that the tide would have drowned out our domestic production if it had not been arrested by the wool tariff.

Though the prices of wool are yet low, and will be likely to

continue low, there has, by this tariff, been given a confidence in the stability of the business, that leads to a further increase in production, and confidence that the time is not far distant when a full supply will be furnished our mills of all the wool that they can consume, except perhaps some so-called carpet wool, that is of a grade so low that our farmers are not likely to raise it.

From the Convention held in 1865, the permanent prosperity of the wool industry of the United States may be dated.

The alliance made between the growers and the manufacturers of wool has proved its value, especially to the growers. The manufacturers publish a periodical known as "The Bulletin of the National Association of Wool Manufacturers." This quarterly magazine is most ably edited, and is devoted to the defence of the common interests. Any attack made on either grower or manufacturer is promptly met by articles published in "The Bulletin," written by men thoroughly conversant with the whole question. The growers of wool are too much scattered, and have no concentrated capital, and could not of themselves keep the public informed, nor could they repel the attacks of wool importers and free traders who control so many publications and have so much concentrated capital at command. Thus it is most fortunate that the manufacturers have undertaken this work, and the good faith they have shown is most admirable. To cite an instance: In November, 1874, a committee of seven importers of wool and merchants made a report to the Chamber of Commerce of New York, in which they assumed to know the interests of both growers and manufacturers so much better than they did themselves, that they assured us that a merely nominal *ad valorem* duty, to be applied equally to all grades of wool, was just what we needed to promote and make certain prosperity.

This report, full of erroneous statements, was at once met by the associated manufacturers by the publication of a petition to the House of Representatives, which petition represented ninety-six establishments, employing 1,078 sets of machinery, in which they say that the present tariff "is promoting the growth of wool

in all parts of the country, particularly in the extreme West, thereby insuring a constant supply and uniform prices in the future; that it is giving the people cheap goods by reason of intense home competition, and yet manufacturers are not discouraged, but continue to employ their capital and inventive energy in the production of nearly every kind of woollen goods used in the country."

The fallacies of this report to the Chamber of Commerce, made by dealers in wool, are most ably met and refuted in the January to March number of "The Bulletin." Thus the interests of the growers found prompt defence from their allies, the manufacturers.

The late attempt to fasten upon this country that most vicious measure, the Reciprocity Treaty with the Dominion of Canada, perhaps would have succeeded but for the prompt resistance made through the Association of Manufacturers, which was the more commendable that it was for the temporary interests of the worsted manufacturers to obtain the Canada wools free of duty.

Thus far, "The Bulletin" has been quite as useful to the growers as to the manufacturers, for it is conducted in the full belief that the lasting prosperity of each branch of the great woollen industry is absolutely dependent upon the prosperity of the other.

One of the obstacles formerly in the way of the prosperity of the wool-growing interests of this country has been the constant cry, raised by free traders, that our home-grown wool was not suitable for the manufacture of fine and valuable woollen goods.

This question has at last been settled in our favor, and it is now known that American-grown wool is as strong and durable as any raised in the most favored localities, and vastly superior to a great part of the wool that is imported, and that it is especially adapted to the making of fabrics most in demand by our people.

The excellence of the American merino is now so well established that there is a large and profitable exportation of stock animals to New Zealand, Australia, South America, and other

wool-producing countries, to improve the flocks from which our importers receive the best wool they handle.

To aid in our future success, we have the now admitted best variety of sheep, producing clothing wool, that exists, and this variety is the result of the skill in breeding and management of American wool-growers on American farms.

The tendency of wool production in this country has been to increase much more rapidly in the West than it has in the East, and all things point to a still more rapid advance in the Pacific States.

The question comes up, Can wool be profitably raised on the high-priced lands of the East, with the immense pressure of competition from the West that a very few years must see in full force? Yes, the East will continue to raise wool, and will increase its production in the face of this Western competition.

We have only to look at Europe to give us confidence in this matter. France is famous for the production of a sheep that combines most valuable wool with great carcass that makes food. England is the greatest sheep-producing country of the world, in proportion to its arable lands. Its sheep has a valuable fleece and most valuable carcass.

We can hardly believe that our own country will fail to follow in the same agricultural methods as England, so far as the production of flesh food and the fertilization of the soil to make it produce grain is to be considered. England, with its dense population and great manufacturing cities, has found the sheep to be the most profitable animal to be fed on its high-priced lands. "Not only in quality and variety but proportionately to any other country in the world, Britain feeds the largest number of sheep. Irrespective of adaptability of physical characteristics, the mere fact that of all animals this is the easiest fed, gives perhaps the largest returns in the shortest time, and is a first-class fertilizer of the soil, is sufficient reason for such a prominence." We take the foregoing from a recent book written by William Brown of Scotland, devoted to the subject of sheep in Great Britain. In this volume we have the latest details of the present condition of sheep-farming in that great nation. And

as we are very soon, if we have not already, in the older States commenced modifying in a very essential point our own sheep-husbandry, and adapting it, as have the British farmers, to the wants of our own times and localities, we may well look to this book for some useful lessons.

We find from this author that the government statistics show that the British Islands are divided, agriculturally considered, as follows : One-third of the land is in a rotation of cultivated crops, having grass lands that are seldom more than three years in grass until again cultivated ; one-third in permanent grass, — a large part of which was once under cultivation, — and the remaining third has received little or no attention from the hand of man.

The total area of the kingdom is given at 77,284,184 acres, and the total number of sheep to be 34,532,000.

These sheep realize an annual produce of the value of \$150,000,000. To take a single county, that of Leicestershire, as an instance of the distribution of these flocks : The total area is 514,000 acres, consisting of 177,000 cultivated, 274,000 reclaimed or permanent pasture, and 63,000 unreclaimed. There are in the county 466,000 sheep. This is the home of the famous breed that takes its name from the county.

Sussex, the nursery of the Down sheep, has an area of 937,000 acres, carrying 580,000 sheep.

It may be said of England that there is an average of one sheep to every acre and a quarter of all the country, including forest and water. And these sheep are so large that they are estimated to average when slaughtered sixty-five pounds of mutton each ; and three years being assumed as the average life of the sheep for the whole kingdom and for all the breeds, 11,510,000 sheep are every year slaughtered for their mutton.

These sheep are principally sustained on the pastures, turnips being depended upon in winter and as a "grounder" for fattening for the butcher. If England could raise such crops of corn as we can, this turnip supply would be of far less importance there than it now is.

Britain cuts from its sheep over 154,000,000 pounds of wool

annually, the several leading breeds contributing as follows : Leicesters and their crosses and varieties, fleeces averaging seven pounds each, giving a total of 90,531,000 ; Downs, fleeces of four pounds each, a total of 24,520,000 ; Cheviots, fleeces of three pounds, total 13,104,000 ; black-faced, two and a half pounds each, total 14,027,750 ; Welsh and Irish, two pounds each, total 12,000,000, — making in all an annual production of wool of 154,182,750 of pounds.

This is a mere summary of the sheep industry of Britain, and is here only presented to show that on the highest-priced agricultural lands the sheep is the most profitable animal to raise for the markets, and the best animal to manure the land. The ewe gives two dividends each year, — her fleece and her lamb. The males give larger fleeces, and go to market well matured sooner. The beef-producing animals give no dividends, and the grower must go on adding to his expenses till the end of their lives, when in one gross sum he must find his total compensation, if he can.

The cultivation and improvement of the so-called "mutton" breeds of sheep has in Britain been carried so far that now the most desirable flesh food, and the best wool for a large proportion of the woollen goods now in most demand, are combined in the same animals, and with these important qualities is joined early maturity and wonderful powers to accumulate weight of carcass in proportion to the food used.

Already our farmers, in the older parts of our country, are turning their attention to the raising of such sheep as have proved themselves to be so profitable in Britain, and are making crosses between these breeds and the American Merino, producing a very valuable animal in all respects. The pressing demands of our manufacturers for long wool for combing, and the manufacture of the now so fashionable and valuable worsteds and dress goods, will cause a very rapid increase of flocks derived from the English breeds and their crosses with the Merino ; and the increasing demand for good mutton, and the remunerating prices paid for the best grades, will soon teach our farmers, through their pockets, in which direction lies their road to

more profitable methods of conducting their business, than any they have before known.

It is not easy to see any good reason why the older sections of our country, having great cities and manufacturing centres for markets, should not follow the example of England in this matter. It has been proved by the best tests, that of actual trial, that our soils and climate are well adapted to these heavy sheep. Nothing of uncertainty on this subject remains, but the uncertainty of our national legislation. A policy of free trade in wool and woollen goods would for a while destroy our purchasers of wool, and ruin both branches of the business. If the existing revenue laws can be allowed to remain, we may reasonably hope that, at least, the present prices of our wool will be continued to us, and, if so, we can continue to expand the production. The business will in the older parts of the country be a close one, yielding very small direct profits, but indirectly so very valuable as the means of making manure to raise grain crops that it will go on, and more economy in food, housing, and general management will come in due time as skill increases, and the mutton-producing sheep and the growing of grain will go hand in hand. The great value of flocks of sheep in keeping up the fertility of the lands of the older States was shown by the late William Chamberlain of Red Hook, Dutchess County, N. Y.

In 1840 he purchased a farm at that place that had 380 acres that had been used to raise hay to sell so long that it was worn out. The hay crop of 1841 was seventeen loads; forty acres of rye gave ten bushels to the acre; twenty-five acres of corn averaged twenty bushels to the acre; the remainder of the farm was called pasture, and proved equal to the grazing of one span of horses, two pairs of oxen, and one cow. The land was so exhausted that it would not raise red clover. The so-called commercial manures were tried, such as guano and superphosphates, with but little advantage; wood ashes were better, but none of these substances could be used with economy, and Mr. Chamberlain was forced to act on the assumption that the Spanish proverb was true, — "The hoof of the sheep is gold."

The detail of his process of improvement was given by me in

"The Tribune" in 1869, and would take too much room for repeating here. But by using sheep as manufacturers of grain, hay, cornstalks, straw (swamp muck, of which the farm had an abundant supply), leaves, and weeds, and weeds into manure, he not only restored this worn-out farm to its original fertility, which could never have been very great, as the soil is quite deficient in lime, and consists largely of sand and ground-up granitic rocks; but he made it so productive that its crops would attract attention, and be highly satisfactory, in even the far-famed Genesee country, or even in Ohio.

I have an account of the crops of 1866 — 800 loads of hay, estimated to weigh, in the winter, fully 600 tons; 40 acres of Indian-corn, estimated to yield 50 bushels to the acre; wheat, for which the land is not well adapted, but which is the best crop with which to sow timothy and clover seeds, 30 acres, averaging 15 bushels; 30 acres of oats, 8 acres of roots, and the pasturage of 300 sheep, and the teams, cows, &c., necessary to carry on the farm, and to supply the families on it with milk and butter.

The winter before he fed 300 sheep for market, making a direct profit of \$1 each; and he fed 37 steers and oxen, and wintered 300 store sheep and some cows and young cattle; all these animals made an immense pile of the most valuable manure.

Mr. Chamberlain's plan, when he first commenced making manure by using sheep, was to spread it thinly, so as to go over all the surface he could, and have enough to make clover grow; and he said that when he had brought his land to where it would produce red clover, that thenceforth improvement was easy and rapid. The sheep not only gave the first impulse, but were all the time depended upon as the great manure-producing power; and the resulting change in so short a time is most wonderful, and teaches a lesson that is of incalculable value to the whole people; and Mr. Chamberlain should be classed among the greatest benefactors our country has produced.

Having been raising sheep for many years, in connection with grain, I add to this account of Mr. Chamberlain's great success in improving a large farm from its own resources, my own ex-

perience, which may be condensed into a single sentence. With about one sheep to the acre of cultivated land, pasture, and meadow, we raise more bushels of grain on the average than we did when we had no sheep to manufacture our coarse forage into manure, and to enrich our pastures to prepare them for grain crops, and the land is constantly improving, and the crop increasing in quantity; and we have the wool and mutton produced by our flocks of sheep in addition, producing our crops on less acres and at less cost, than we did before we kept the sheep.

The Merino, as improved in the United States, will furnish the basis of cross-breeds with the English families, and new varieties, quite likely, will be thus established. In any event, there will continue in the Eastern States to be flocks of the purest bred Merinos, handled in the best manner by breeders of experience, from which the blood must be drawn to keep up and improve the great flocks of the far West.

The raising of wool in the West and South-west must be conducted in a manner very unlike that of the East. Large flocks, some of them perhaps migratory, and having great ranges of pasturage, with very little winter housing or feeding of forage, supporting themselves with little attention from the shepherds as compared with the care given in the East, where the winters are severe. This Western system will render it any thing but profitable for the flock owners to enter into that laborious process that is necessary to improve a breed, by themselves raising the animals that are to infuse constantly new energy and merit into the great flocks that, under the management they will have, will constantly degenerate unless kept up by frequent infusions of the blood of vastly better individual animals. So these Western flock masters will make a constant demand on the Eastern flocks for breeding animals, and the Eastern breeders will find their profit in supplying that demand.

The great plains of the South-western trans-Mississippi States and the Pacific States give a field for the production of fine wools equal in all respects to Australia or New Zealand, and superior to South America; and, when American energy and skill shall have once taken hold of the business of wool-raising on these

great plains, this nation will become one of the great sources of the world's supply of fine wool, and from these plains vast exportations will be made.

The Eastern States will adopt a plan of sheep-raising similar to that of England; and if our city population continues to increase, as in the past, it would be hard to assign a limit to the home market for mutton and the wool of the best mutton-producing breeds.

Even now the great cities of the East receive their principal supplies of meat that is raised very far off, much of it in Texas. A supply produced nearer the place of consumption is now greatly wanted.

The wonderful increase of city population, as compared with the rural population, is much commented upon by writers upon public affairs, and many fears are expressed as to the ultimate influence this creation of cities and great villages is to have upon our national prosperity. We see in it a home market at paying prices, for all we can make our soils produce under the best management of the best processes of our improved and still rapidly improving agriculture.

The plain and unmistakable policy of the nation is to protect, as it now does, the wool industry that is now in existence, and continue that protection until the business in all its branches is placed upon a basis so firm that it is made certain that we shall be independent of all the world in a matter so important as the clothing of the people.

THE APPLICATION AND LIMITATIONS OF ART IN TEXTILE FABRICS.

IN an article of our last issue we attempted to show that this country is by no means inferior to other nations in the supply of substantial and useful materials for clothing the masses of its population. Here our self-complacency ends. We shall not be mortified, because we shall not be surprised, by the proofs of

superiority in the production of fabrics of luxury with which European nations will adorn the coming International Exposition. Though not without some happy results in our attempts in this direction, we have, upon the whole, been content to permit foreign manufacturers to occupy the higher field of artistic excellence. The question is coming home to manufacturers, whether they can afford to confine themselves to the field in which raw material is the chief element of value, and to abandon the more profitable field where money is coined chiefly from taste and skill.

Manufacturers and selling agents who watch, with a vigilance not commonly suspected, all the indications of popular demand, are keenly aware of the fact that even the lowest classes of consumers are becoming discriminating in their tastes. With cultivation, beauty, or supposed beauty, becomes more and more an element in the selection of fabrics for personal use. While the masses are being elevated, thus increasing the demand for superior fabrics, a change even more marked is taking place in the higher class of consumers, a class growing daily larger by the prosperity of this country in its normal state. Mr. Gladstone remarks in his Vatican letter, that the claim for revival of ancient forms in church architecture and decoration, asserted in behalf of the English ritualists, is without foundation, as they had been simply influenced, among others, by the wave of art revival which has flowed within a few years over the whole civilized world. We have seen its manifestations in this country principally within the last ten years. We see it in the street architecture of rebuilt Chicago and Boston, in the improved suburban gardens of our cities, in the use of color in interior decoration of houses and churches, in household-art stores, in the complete revolution in the styles of furniture, in private collections of china, in the numerous art books offered for sale in our book-stores, the many shops for engravings and picture-frames, and, most of all, in the introduction of drawing as a study in our public schools. Now it must not be supposed that our manufacturers do not partake of this general appreciation of art which is pervading the community, or that they do not feel

the necessity of meeting the demands of an improved public taste. It is not without a smile that we read the homilies addressed to our manufacturers by the would-be reformers of public taste, who have only just learned the rudiments of taste. Mr. Eastlake says, that every woman believes taste to be her strong point. We sometimes think that there is scarcely a man either, who can write an item for a newspaper, who does not believe himself possessed of this same monopoly.

In speaking of the application of art in textile fabrics, we disclaim any purpose of instructing the practical makers of ornamented fabrics, who, in making and selecting their designs, exercise more industrial art than a merely reading man can ever know.

We take it for granted, too, that these practical producers who adapt their fabrics to the key-note of the public taste, as the leader of the orchestra tunes his instruments to the concert pitch, are aware that the key-note, like the actual concert pitch in music, is being constantly raised. We assume that they know, as well as the public lecturers, that the beautiful has a commercial or money value, that art can lend to an article a value greater than that of the material of which it consists, and that industrial art in the best manufacturing nations, as in France, is the main-stay of their industry. Assuming a just recognition of the value of industrial art among those engaged in production, we shall attempt to show that there is much ignorant enthusiasm on the subject of our industrial art reform, and that art progress in our textile fabrication is to be attained mainly by influences beyond the control of manufacturers.

Let us first consider the *limitations* of art in the textile manufacture.

In the first place, we must exclude from textile manufactures, according to the accepted meaning of *manufactures* at the present day, those made exclusively by the hand, such as the Gobelin tapestries, cashmere shawls, Japanese embroideries, point-laces, &c., which are the highest art fabrics, because, unfettered by machinery in their production, they may have unlimited applications of design and color. These productions, from our high

cost of labor, can never enter into our manufacturing industry, without an undesirable reduction of our prices. They must for a long time continue to be foreign luxuries. Thus, the most fascinating part of textile production is denied to our manufacturing industry; although it ought to be and will be pursued as a most charming and instructive employment for ladies in the household. This will be a means of forming and diffusing taste and models which will exert a most beneficial effect upon the more practical textile manufacture.*

* Nothing can be more narrow than the contempt which many practical men feel for the ornamental work so much enjoyed by their wives and daughters. This enjoyment shows the existence of artistic feeling, which only requires proper direction and higher standards to produce most happy results. Berlin wool work copied slavishly from purchased patterns is poor enough. It would be respectable if made from original designs. But much higher fields are open for works of ornamentation in textile materials. The making of laces, in their most precious forms, pursued in ancient times by the most noble dames, should be revived. Embroidery, of which Japanese art shows us such brilliant examples, has great resources. We see no reason why the art of weaving the more costly silk brocades might not be learned and pursued in the household. These fabrics are woven in China and India on the simplest forms of the loom, and invention might give us a Jacquard hand-loom for household weaving. Why not this as well as the family knitting-machine. Women have only to be taught the highest standards for the products of their fingers or needles, and that they can learn and do any thing which has been done by hand, to enable them to produce works which would be better adornments for their houses than any thing they can purchase. It is often said that women were happier when they made their cloth for the household. But there is more pleasure in doing artistic than mere mechanical work; and ornamentation of the home is really as necessary as appliances for comfort. There is, probably, no simple pleasure greater than that derived from artistic employment, if pursued without neglect of common duties. Let, then, art penetrate every household. It will illuminate it like the sunlight.

We have recently seen with much interest a more humble household occupation possessing much capabilities of art. While on a visit to South Berwick, in Maine, our attention was called to the production of rugs, which is pursued extensively in the rural neighborhoods of that section. It was introduced by an English wool manufacturer, who formerly conducted a mill at the Great Works. The rugs are made of woollen rags of various colors, the two ends of which are brought through a backing of burlap by a process called "hooking." The proficients in the art are called good "hookers." The surface is firm and uniform, and the colors and outlines are very distinct. The patterns were very effective, and the combinations of colors pleasing. Much skill is displayed in dyeing the rags. Excellent and fast brown or wood colors are obtained from varieties of moss collected in the woods, and other native dyes from the alder, maple, and scarlet-oak. The making of these rugs is carried on principally in the short days

Again, even these higher fabrics are but imperfect mediums for representing art forms. The most marvellous production of the Gobelin loom is but an imperfect copy of the picture it aims to reproduce in wool and silk. The inadequateness of the material invariably reveals itself in some imperfection of outline or shade. The Madonna in Gobelin tapestry, or the reproduction of Victoria and Albert with the royal children from the Jaquard loom, are wonderful; but they just fail to be art. How much greater is the limitation when the fabric is to be produced by an automatic machine. Take the woollen fabric in which art exhibits some of its best results, the carpet. The stitches cannot be less than one-tenth of an inch in diameter, limiting the shade and outline. A two-ply ingrain carpet can have only two colors in any line running through its length; a three-ply ingrain may have three. A Brussels carpet may have five, and, if of extra quality, six colors in any line running through its length, but no more. An Axminster carpet, which is woven by hand, may have any number of colors in its formation, but is too costly for general use. A tapestry carpet may have the same command of colors, as the colors are printed on the warp. But there is a limitation in perfecting outlines, and the carpet is not enduring.

A carpet design has not only its mechanical but its artistic limitations. It is to be placed upon the floor, and to be looked at from above. No objects can be properly introduced, as ornaments, which point upwards, and are usually seen sideways, as trees or vases, or objects which have a bilateral symmetry. Such objects represented on a carpet are seen inverted, and are unpleasant to the eye. A carpet pattern, therefore, should be equally extended all over the surface and have a radiating symmetry, as the plants in nature's carpet, pressed by the foot, are visible in the grass as radiating ornaments. The flower of the dandelion, with its horizontal radiating leaves, is a familiar exam-

and long evenings of winter, and the young women often assemble in "bees," to construct some more ambitious work. Formerly the patterns were all original. Unfortunately some ingenious manufacturer furnishes backs for sale, with outlines—generally shockingly bad—sketched upon them. If really artistic designs could be furnished, they would be readily executed, and would furnish articles really more pleasing than the loom-made rugs ordinarily used.

ple. A fabric for a curtain is intended to be looked at sideways, and should avoid the radiating and seek the bilateral symmetry. These are but illustrations of the art limitations which are found in every fabric.

If we analyze other fabrics, especially those which are produced in this country, we find a much narrower field for design or artistic auxiliaries than we might at first suppose. Take the most important of our woollen fabrics, fancy cassimeres, they are woven on looms, such as the Crompton, which are capable of producing an infinity of designs. But good taste, and fashion, which fortunately now coincides with good taste, demand that these designs should be of the simplest character, and, indeed, almost invisible. The best exercise of taste in these fabrics is in subduing rather than in giving color and design. A comparatively narrow field is, therefore, given in these fabrics for artistic improvement.*

In woven dress goods, whether of cotton or woollen, or wool and cotton, the designs are almost limited to simple stripes or checks, or the combination of lines and squares known as stripes; although skill and a correct eye for color are required for these patterns, it is but a very narrow field of industrial art.

The silk manufacture, which is now occupying so important a place in our textile industry, formerly depended mainly in its higher branches upon the artistic excellence of the designs of its fabrics. Fashion now compels all dresses to be plain or uniform in color. The manufacturers of Lyons lament the times when, through the genius of their wonderful artists, they could compel the whole world of fashion to be clad in their brocades and figured satins, whose variety and perfection of design defied

* We feel that we must modify this statement since seeing, after the above was written, the beautiful cassimeres made at the Bel-Air Mills, in Pittsfield, Mass. About a hundred different styles are made for each of the two seasons. We were vividly impressed by the evidence of skill and artistic design displayed in the multiform patterns, not one of which would be rejected by the most fastidious taste. If, as according to present indications, the lighter cassimeres will be in demand for ladies' winter dresses, there will be scope for the most delicate designs of the manufacturer.

imitation. In those days all the eminent painters, sculptors, and even botanists and florists of Lyons, became associated with the staple trade of that city, and gave to it their happiest conceptions. Every considerable house had a partner who owed his place to his success as an artist. The French expert reporters upon the Vienna Exposition observe, that the only silks exhibited showing art in design and texture were for furniture use. In this department there is still a field in which art excellence is the main test of superiority. This department of manufacture has not been attempted in this country, and, the consumption being confined to the luxurious, cannot be profitably undertaken here.

Almost the only field left for the application of art in our textile fabrics is in that of printing, either upon cotton or mixed dress goods of cotton and wool of the class of delaines. Even this field, apparently so boundless and so vast in the applications of the best results of modern chemistry in the uses of color and chemical reagents, has great limitations in the direction of art. There is limitation in printed calicoes of the size of the figure which can be appropriately used. While muslins, which are open in texture, can bear a large figure to make the pattern distinct; calicoes, which are closer in texture, would be coarse with large figures. There are, again, limitations of color and shade, as ordinarily not more than seven can be applied by the roller. In goods that are warranted to resist washing and sunlight, there are restrictions caused by the instability of certain dyes. The colors upon these goods are almost exclusively confined to such as can be made from madder and its derivatives, or the artificial madder, alizarine, indigo, and aniline black, all of which resist soap and light. The best patterns, and all which endure from year to year, are the simplest vegetable or geometric forms, simple leaves, sprays, spots, lines, and checks.

Indeed the grammar of ornament in prints would seem to be already full. Novelty is produced by the rearrangement of old forms. The superintendent of one of our largest print works says, that there is really nothing new in design. The best designer he ever knew used nothing but his scissors, serving the

public taste with them, just as the editor constructs with his scissors the newspaper which shall satisfy his morning readers. A good designer, who had been ten years in his employ, pointing to a simple figure on a print, said, "*That* certainly is all mine." He had designed in that mill for ten years, and could claim but one little figure as original. We would by no means say, that designers of skill and genius are not required and employed in our print works. It is a genius and skill which do not make true art their principal object, but which have their end in satisfying the public taste, whether it is good or bad.

The most beautiful branch of printing, that upon cretons or furniture stuffs, has not been attempted here; although we are informed, that, if it were profitable, it could at once be pursued by present establishments with certainty of success. These prints, as made principally at Mulhouse, exhibit in their designs artistic excellence of a very high order. To our eye some of them are the most charming of all the products of impression or texture. The shades and color, which are of great variety, are applied by the block instead of the roller. This manufacture will hardly be attempted here, as a few hundred looms would supply the present demand

It may be said, that, granting all these limitations, why cannot our manufacturers conform to the principles of art or of correct taste, so far as the nature of their material will admit, for this is all that can be asked of any industry. The answer is, The manufacturer produces for the market just as it is. He aims to meet the public taste, whether refined or vitiated. He makes goods to *sell*. An accomplished designer said to us, "The emigrant fresh from Ireland wants roses on her calico that shall look like cabbages, and we must satisfy her." Manufacturers are perfectly conscious of the enormity of many of their own designs; but they are not reformers. A director in an English art school visiting a carpet mill at Lowell, and looking at a carpet with a rustic pattern, said, "How shocking to have to entangle one's feet in those crooked sticks!" "I agree with you," says the agent; "but that particular pattern has proved to be one of the most popular we have ever made, and we must continue

to make it." A former selling agent of our largest printing establishment, and consequently the controller of its designs, a person of unusual taste, some years ago determined that he would effect a reform in public taste, and that he would make only such prints as *ought* to be worn. He directed the creation of a series of designs upon the most correct artistic principles, and the goods produced were really intrinsically beautiful, "such," as our informant said, "as we should delight to-day to see upon our wives and daughters." This whole line of goods, as our informant says, "which should have brought sixteen cents a yard, we were compelled to sacrifice at twelve, involving the most serious loss in all our experience. From that period we ceased attempting to reform the public taste." An eminent carpet manufacturer tells us, that, in their designs, they always have one eye to the popular taste and the other to that which true taste or art requires, endeavoring as far as possible to reconcile these conflicting demands.

A great many publications have recently appeared explaining the requisites of art in industrial work, such as the works of Eastlake, Smith, Hulme, and Dresser. The best of these, in our opinion, is the "Principles of Decorative Design" by Christopher Dresser. Some extracts from his remarks on carpets will show what the most cultivated English taste requires in this fabric, and the admitted failure of English makers to meet these requirements.

"I wish to say that the effect of a carpet should be glowing or radiant or bright, as opposed to dull, quiet, or heavy; that it should be such as results from the use of a predominance of bright and warm colors, rather than of cold and neutral hues; that it should be neutral, inasmuch as it should not present large masses of positive color, but should have an equality of rich harmonious colors throughout; that it should be 'blooming,' or have the effect of a garden full of flowers, or, better, of the slope of a Swiss alp, where the flowers combine to form one vast harmonious glow of color. Yet it should never present flowers imitatively rendered, as its ornamentation.

"Such imitative renderings are not to be produced by the ornamentist; they must come from the pictorial artist, for they are

pictures. They cannot form suitable backgrounds to furniture and living objects, for they are positive and not neutral in their general effect. A picture, also, will not bear repetition; whoever heard of one person having two copies of the same picture in one room? Yet a pictorial group of flowers may be seen repeated many times over a floor, which is very objectionable. The effect to be produced is that of a rich color bloom."

The following condensed rules are given by the author for the application of ornament on carpets:—

"1. Carpet patterns may with advantage have a geometrical formation, for this gives to the mind an idea of order or arrangement.

"2. When the pattern has not a geometrical basis, a general evenness of surface should be preserved.

"3. Carpets are better not formed into 'panels,' as though they were works of wood or stone; on the contrary, they should have a general 'all-over' effect without any great accentuation of particular parts. The Indian and Persian carpets meet this requirement.

"4. While a carpet should present a general appearance of evenness, parts may yet be slightly 'pronounced' or emphasized, so as to give to the mind the idea of centres from which the pattern radiates.

"5. A carpet should, in some respects, resemble a bank richly covered with flowers: thus, when seen from a distance, the effect should be that of a general 'bloom' of color; when viewed from a nearer point, it should present certain features of somewhat special interest; and, when looked at closely, new beauties should make their appearance.

"6. As a floor is a flat surface, no ornamental covering placed on it should make it appear otherwise.

"7. A carpet, having to serve as a background to furniture, should be of a somewhat neutral character.

"8. Every carpet, however small, should have a border, which is as necessary to it as a frame is to a picture."

These effects, which are so well produced in Persian and Indian carpets, the author admits, are rarely produced in English carpets; owing either to the want of skill on the part of

the ornamentist, the want of judgment on the part of the manufacturer, or the want of taste on the part of the consumer. In this deficiency of taste, the author considers American customers to be most flagrantly deficient.

"Judging," he says, "from the carpets which they order, I imagine that taste in matters of decorative art is nowhere so depraved as it is in America. It is true that the great floral patterns have ceased to be demanded by them; but they are only replaced by coarse, raw-looking, panel patterns, colored in the most vulgar manner, and without even a hint at refinement, or harmony of color. Let the pattern be 'loud' and inharmoniously colored, and the chances are excellent of its sale in the American market."

We can forgive the slurs cast ostensibly upon us, but really upon their own productions, for the passage which follows:—

"We must not forget that even in our own country [England], bad patterns sell equally as well as good, inartistic patterns as well as those which are of a more refined character, and that even in Great Britain more of the indifferent, if not of the bad, sells than of the good. Let us cast the beam, then, from our own eye before we try to extract it from that of another."

These passages sufficiently prove, that, in spite of the canons of art, it is the consumer who buys, and not the manufacturer who sells, who fixes the artistic character of the commodities furnished for the market.

Unfortunately, there is no limitation in the lowest form of industrial art,—that of mere copies of foreign designs. Patriotism and true taste demand something original and national in American industrial art. We fear that there will be, for a long time, an insuperable obstacle to this in the supremacy of fashion. It is well known that nearly all the cheaper fabrics, especially for female wear, are imitations, in less costly material, of fabrics worn by the fashionable or wealthy classes. The designs of the greater part of these fabrics have their origin in France, or rather Paris. All the manufacturing nations of Europe supply themselves with designs

from the houses in Paris, which carry on a great traffic in designs, besides imitating the French novelties which are in the market. All France equally repairs to Paris for its taste. As an expert French writer says, "Whatever merit or novelty the different manufacturing centres of France exhibit, they all nourish their taste at the focus of Parisian thought. Their designers illuminate, their dyers tint, their workmen weave, only to realize the idea they have received at Paris by indication or inspiration." Mr. Kastner, the teacher in the Lowell School of Design hereafter referred to, tells us that the designers of Mulhouse, Rheims, and even Lyons, find it a necessity to repair every year to Paris for inspiration. When we have a capital like Paris, "where every consumer is a judge, and becomes a guide to the merchant and manufacturer, to whom they impart their impressions, who appreciate only what is good and consecrate only what is really beautiful; where the shop-girl and the lady, the artisan and the dandy, have received and preserved, without knowing it, all the traditions of art," — we may be independent in our art industry. We need not, however, be troubled: we are hardly behind Germany, and not much behind England.

In the industrial-art work attempted here we have made unquestionable progress, and have been aided by a corresponding improvement in public taste, and an indispensable auxiliary of design, — the fixing of good and fast colors. Our dyers and printers have made great attainments. All of the print works and carpet factories keep designers constantly employed. They are almost invariably Frenchmen, Germans, or Scotchmen. Nobody but a Scotchman, we are told, can make a design for a plaid. The work of designing, though attractive, is fatiguing to the eye and mind; and some designers are compelled to obtain refreshment to the eye by taking their work to the country. The designing is often done away from the mills, and under the immediate direction of the selling agents, who more immediately feel the public taste. A very large part of the work is absolutely thrown away; the design, after being executed on the loom, being found defective. The foreign

designers require to observe and practise many months before they can adapt themselves to the American tastes. Some of the best designers have left the country in disgust at their want of adaptability.

In carpets especially there is much originality of design. Many establishments prevent their designs from being copied by having them patented, which may be now done for a moderate fee. Our carpet designs are frequently copied by English manufacturers. In observing with much attention the printed fabrics for the next season at several establishments, we were agreeably impressed by the general modesty of the designs, and their conformity to the requisites of good taste; and were assured, by those capable of pronouncing an opinion, that we fairly compete in design with foreign fabrics of the same grade. Our improvement is no less marked in the styles of the fancy cassimeres made in many establishments. Sober tints, delicate shades, a great variety of textures, though so little conspicuous as to be scarcely observable, are the characteristics of these goods. They are unquestionably superior in taste to the average of British goods.

It will be seen that we claim for our American fabrics nothing higher than mediocrity in their adaptation to the requirements of industrial art. We ought not to be content with this mediocrity. An enthusiastic believer in the possibilities of our national achievements in industry, under the influences of a national system of political economy,* says:—

“Our democracy is passing out of the Thersites stage into that of Pericles, and all past history of democracy bids us expect a grand era of the fine and the industrial arts, which have always lived the grandest life when in alliance with each other, and with freedom and popular government. Especially in our industrial age,—whatever may be the future of the fine arts,—the manufactures that approach artistic merit and excellence may be expected to make great advances upon any thing the past has seen, and to bring the finest combinations of form and color within the reach of all who can compass even the necessities of life. For this

* Professor Thompson.

end the artisan must once more become the artist; for all true art in every nation has been born in workshops which were also studios, while it has been pampered and finally destroyed in the palaces of nobles and kings."

With all that is beautiful and true in this hopeful picture of the future, it must be qualified by the necessities of manufacturing by machinery. The machine is a leveller in art, as it limits the individual power of the workman. There are but few machines which, like Perkins's printing roller, Jaquard's and Bigelow's looms, have increased the artistic range of manufactures. Future inventions will make the common workman more and more the dependant on the machine, and not its master. The dream of Ruskin, Ferguson, and Thompson, that the common workman may take the artist's delight in his work, we fear will not be realized, certainly not in our factories. The work of the operative on the machine, and of the artist for the machine, will be more and more distinct. Improvement will not come from the workman, except as an integral part of the whole community. Neither is our future improvement in art industry to be brought about by manufacturers, the directors of machinery. It must commence with our people, — with ourselves, the consumers. Let even the best educated of our readers attempt, as the writer has done, some work in decorative art. Although he may have some general notions about pictures and statues, when he begins to *work* he will be impressed with his deficiency in the rudiments of the lowest stage of art, — that applied to industry; above all he will feel the need of examples, drawings, illustrations, and models. The first necessity for the general improvement of the public taste is ready access to well-stored industrial museums. The industrial museum at Kensington has done more to educate the British taste than all books on art ever printed. A most commendable work in this direction has been commenced at the Boston Art Museum, and in the Metropolitan Museum at New York. These museums should be established in every State at the public expense. To charge fifty cents for admission, as is done at these named, is to practically exclude them from the public. These museums at present are principally rich

in specimens of the ceramic art, which have the advantage of most perfectly preserving the art forms of even the most ancient times. Instructive as these are, we yet hope to see full collections of textile fabrics, especially those from the East, where art is intuitive in even the lowest workman.

The next, if not the most important means of improving our industrial art, we have happily commenced in earnest, — that is, public instruction in drawing. Our beginning is an era in our education. The revival of industrial art, which marks this age, commenced in England through the influence of the first Universal Exposition at London, in 1851. England then saw that in products involving taste she was inferior to all the industrial nations, except the United States. The government found itself compelled to take measures for popular instruction in art applied to industry. A new section, under the name of Science and Art Department, was formed in the Privy Council, having for its special object the popular dissemination of a knowledge of science and art as applied to industry. The South Kensington Museum was established in 1852. It was founded at an original cost of six million, and receives an annual grant from government of about five hundred thousand dollars. Besides giving general instruction in fine and industrial art, and sending out numerous travelling collections of art for local service, this school provides special training, free of cost, to those whom the government selects, as the most promising candidates for art masters, and who, upon finishing the course, are expected to take charge of art schools in different parts of the kingdom. Thus the South Kensington Museum is the great centre of art instruction for the whole kingdom, but it is only the centre. The educational influence of the government is felt everywhere; and in all important industrial towns art schools for instruction in drawing, modelling, and design, have been established. These schools, under the supervision of the Science and Art Department, are sustained in part by the government, in part by the local authorities, in part by fees, — it being the principal object to improve the local manufactures by making them more artistic, and to promote machine and building construction. They con-

tinue to increase from year to year. According to the official report for 1872, they numbered 172, and were attended by 22,845 students, to whom add the 765 students who attended the National Art Training School at South Kensington. Thus for every 210,000 of the population there was one well appointed art school, wholly devoted to art instruction, with an average of 190 students.

By this scale, according to Mr. Stetson, from whose excellent introduction to Professor Langl's report on Modern Art Education we have made this extract, Massachusetts should have 7 art schools, New York 20, Pennsylvania 17, Illinois 12, which would give the four States a total of 57 schools, with 10,640 students.

The impulse to art education has not been confined to England. It has extended throughout the continent of Europe. The example of England was followed by Austria, by Germany, and quite lately by Russia. There is indeed but one opinion throughout Europe as to the importance of art industrial education, and as to the wisdom of making it universal. The reader who desires to know more in detail what has been done in this direction in Europe can profitably consult the report of Professor Joseph Langl, published at Boston by L. Prang & Co.

In this country Massachusetts was the pioneer in the introduction of drawing in public schools. An act passed by the legislature in 1870 made instruction in drawing obligatory in the public schools, and required cities and towns containing more than ten thousand inhabitants to make provision for free instruction in industrial drawing to persons over fifteen years of age. At present every town in the State, having the required population, with a single exception, has complied with the law. It was found by experience that the benefits intended by the act could not be realized without competent teachers, and in 1873 an act was passed providing for the establishment of a State Normal Art School, at Boston. At the close of the year 1874 there were on the books, and in attendance on the school, 188 students, and more than that number have been refused admission, principally for want of accommodation. It is estimated

by the director of the school that with enlarged conveniences 500 students would avail themselves of the instruction. Mr. Walter Smith, the State Director of art education in Massachusetts, reports in 1875, that "the progress made in industrial drawing in all directions is greater than he could have conceived possible in the short period of time elapsed since the act of 1870 was passed." An act, to take effect in October, 1875, has been passed by the legislature of the State of New York, providing "that in each of the State Normal Schools the course of study shall embrace instruction in industrial and free-hand drawing," and that "the board of education of each city in the State shall cause free instruction to be given in industrial or free-hand drawing, in at least one department of the schools under their charge." These examples will doubtless be followed by other States.

The establishment of special art schools, for instruction in designing for fabrics, is a matter of more direct concern to textile manufacturers. The details as to one of these special art-industrial schools, which has come under our immediate notice, cannot be uninteresting to our manufacturing readers.

The Lowell School of Industrial Art has been established three years at Boston, under the direction of the Massachusetts Institute of Technology, although its funds are provided by Mr. John A. Lowell, the trustee of the Lowell Institute.

The course of instruction embraces, —

1. *Original Design, or Composition of Patterns.*

This comprises the making of original sketches for patterns, in light and shade, flat or shaded tints, and in outline.

In connection with this work, instruction will be given in the harmony of colors, and in proportion.

2. *Secondary Design, or Variation of Patterns.*

This comprises the alteration and adapting of patterns, either as to form, color, or the number of colors employed; simplifying them, or making them more elaborate, and adapting them to different fabrics.

In connection with this work, the study of the recognized styles

will be taken up, and attention given to the peculiar requirements of various markets.

3. *The Making of Working Drawings.*

Under this head is comprised the working-out of sketches and designs, and putting them into the form and scale required by the manufacturer. Practice will be given in the method of adjusting patterns for printed goods to the size of the blocks or rollers employed, and in drawing out the patterns for carpets and other woven fabrics upon paper, whose surface is divided into small squares, each representing a "pick" or thread.

4. *Technical Manipulations.*

This comprises instruction in the use of instruments and colors specially adapted to pattern-drawing; also exercises in enlarging, reducing, and copying patterns.

The class will be arranged in four divisions, corresponding to these four kinds of work. The student, on joining the class after passing the prescribed examination, will enter the fourth division, and will be advanced to the third, and to the second, and so on to the practice of original design, as rapidly as his proficiency permits. The more advanced students will have the assistance of the lower divisions in the drawing-out of their designs.

Instruction will be given personally to each student over his work, with occasional general exercises.

Drawing from Memory. The designer needs to be familiar with the objects and forms in use in designing, so as to be able to reproduce without a copy the details of ornament, the appearance and texture of fabrics and of natural materials, and the forms and colors of leaves and flowers, which are the chief basis of decorative art. To this end, special exercises in drawing and coloring from memory will constantly be given out.

Manufacturing Processes. A competent knowledge of the machinery and other appliances in use, and some familiarity with their working, is important to the designer. Without it, his designs, however skilful, will be worthless. With a view to the acquisition of such knowledge, the various processes of printing and weaving will be explained to the students, as may from time to time be needful, and excursions made to manufacturing establishments in the neighborhood, where these operations may be witnessed upon a large scale.

It is intended that this course of study shall be thorough and practical, so that students may here qualify themselves to become draughtsmen or designers in manufacturing establishments, as their proficiency and capacity may determine.

The class will be provided with samples of textile fabrics, paper hangings, carpets and oil-cloths, both American and European, and with specimens of Oriental and other woven and printed fabrics, selected for their artistic value, and as illustrating the application of design to manufactures. To these will be added some examples of drawings made by pupils in foreign schools of design.

The school opens in October, and is open daily until the end of May. Punctual attendance at the hours—from nine till one, and from two till five o'clock—is strictly required. *The instruction is free.*

The school has been now in existence three years, under the direct instruction of Mr. Charles Kastner, for fourteen years designer at the Pacific Mills, and formerly a designer and teacher of design in Paris.

The success of the school is evinced by the striking fact, that, out of fourteen pupils who have graduated, eleven are now receiving regular employment in different mills as practical designers. These graduates are all Americans, and are believed to be the only American designers regularly employed in the country. It is worthy of note that the ruling spirit in the direction of this school is the selling agent of the largest mill in Massachusetts.

The success of this school has established beyond doubt the practical advantages of *special* schools in the several departments of industry. A further improvement in the direction of artistic production of fabrics would be the establishment of weaving schools, such as are now found in the principal industrial towns of the continent. The best artistic forms in fabrics are produced by the loom; and the system of "mounting" the higher fabrics on the loom, and the infinite variety of effects which may be produced, constitute a complicated science, which can be learned only by special instruction. Even if the more costly fabrics are not required, manufacturers feel

sensibly the want of well-instructed young men, to superintend the weaving of such fabrics as are now made. The experience of France and Germany is that weaving is an art particularly adapted to being taught in special schools.

The most immediate benefit to our textile manufacturers will result from these special schools, but a far greater artistic reform will result from an improved public taste. Will this improvement really follow from measures of public artistic education now being inaugurated? Can the principles of industrial art be universally taught, like arithmetic or grammar? No question in education has of late years been so earnestly studied as this; and we can assert with confidence, that the opinion of the most earnest thinkers on this subject is, that art has its clearly defined, teachable features, which can be taught in the same rational way that other things are taught, although it is not claimed that all art can thus be taught, or that great artists can be produced by instruction merely. It is held, at least, that the general principles can be learned by the people, which will enable them, if not to produce original works, at least to possess artistic judgment, and enjoy the best achievements in art. In short, our future as a nation depends upon a *national education* which shall recognize our industrial and æsthetic, no less than our moral and political, necessities.

Industrial Miscellany.

COLORS ON WOOLLENS.

THE work by William Crooke, F.R.S., entitled "A Practical Handbook of Dyeing and Calico Printing," published at London by Longmans, Green, & Co., in 1874, is the most valuable and recent addition to this department of technological literature. The author's position as editor of the leading scientific journal in England, "The Journal of Science," and as a lecturer at the Royal Society, as well as his more recent scientific contributions, like his "Essay on the Mechanical Action of Light," republished in the "Journal of the Franklin Institute," is a sufficient guaranty of his scientific authority. The author in this work has undertaken the task of laying before the public, in a compact form, a digest of the vast mass of information on the tinctorial arts found scattered in distinct works and in the scientific and technical journals of all nations. This work demanded great condensation and the omission of procedures useless for their costliness, their uncertainty, and the inferiority of their results.

The chapter on colors on woollens contains more practical information useful to the woollen dyer than can be found elsewhere in the same space. We cannot doubt that the publication of this chapter entire will be acceptable to manufacturers at least, who will thus obtain nearly all relating to wool-dyeing which can be found in an expensive and not easily accessible work.

PRACTICAL RECIPES IN CONNECTION WITH WOOLLEN YARN AND FABRICS.

BLEACHING.

In quantities of 100 lbs. The process is very simple. The scourer should have care that his kettle is not hotter than 132° F., and that the wool does not lie in the bath long enough to become yellow. The goods or yarn are scoured in clean soap, as usual, and then hung up in a closed chamber or bleach-house, exposed to the vapor of sulphurous acid, produced by burning in an iron pot 6 or more pounds of brimstone. When yarn is bleached for the market, it should be put into the sulphur-house without the soap being rinsed out, only switched out well. If the white has to be colored, the wool should first be run through a cold bath, containing 2 lbs.

of muriate of tin, 2 oz. of extract of indigo, 3 oz. of cochineal paste.* Red, blue, and yellow form white, and the wool is naturally yellow; hence the method of treatment. Then take the wool into the sulphur-house. The fabric ought never to be colored after sulphuring, as it will become spotted. Carpet-yarn may be afterwards run through a bath containing 5 lbs. of whiting: this somewhat neutralizes the offensive odor. Care should be taken in bleaching part cotton goods when poles or slats are employed; the wood absorbs sulphuric acid, and will rot the cotton if in contact with the cloth. The poles should be often washed or planed.

ANOTHER METHOD OF BLEACHING.

In the case of a large quantity of goods for printing, it is more convenient to bleach them in large vats filled with water, charged with sulphurous acid, as follows:—

Half fill a stone pot with pine sawdust, and cover it with a wooden cover through which is a hole to receive a lead or glass pipe. Pour enough sulphuric acid to cover the sawdust, and insert the pipe which conducts the sulphurous-acid gas into the vat of water, rendering the joint gas-tight by a luting of clay. To prevent too much free acid going over, the gas may be passed through a strong solution of soda, and then to the vat. The vat, of course, should be covered. The goods are thrown into the water overnight, and when taken out will be found sufficiently bleached.

This method, when modified, will be found advantageous in bleaching the whites of goods colored chrome-black, should such a process be required. To each piece of fabric dissolve 1 lb. of hyposulphite of soda in 2 pails of water, to which add 1 lb. of sulphuric acid, the vessel containing the mixture being well covered, so as not to lose any sulphurous acid gas. All the sulphur must be allowed to settle until the liquid is clear, and the liquid may then be run into a clean tub filled with water. In this bath the goods are to be laid for 6 to 8 hours, when the whites will be found perfectly bleached without injury to the black. Rinse, and dry.

COLORS ON WOOLLENS—BLUES.

WOAD.

Woad alone was used for coloring wool blue before indigo was introduced into Europe. The introduction of indigo was a great advantage to the dyer, not only for its intrinsic value, but because he could daily strengthen his vat, using the old woad as a fermenting agent, like yeast in

* *Cochineal paste* is obtained by placing 10 lbs. of Honduras cochineal in a vessel, and adding 80 lbs. of ammonia water (17° B.), stirring the mixture well. The vessel should be covered with a cloth, and allowed to stand for a few days. The vessel is then to be immersed in boiling water, in order to evaporate the superfluous ammonia; when the evaporation is complete the mixture is ready to be used. The ammonia may be condensed during the evaporation, if employed in large quantities.

making bread. As to the practical value of the different varieties of indigo, it may be said that 4 lbs. of good Bengal are equivalent to 5 lbs. of good Guatemala indigo.

In order to color with indigo we have to deprive it of its oxygen. The deoxidized indigo is yellow, and in this state penetrates the woollen fibre; the more perfectly the indigo in a vat is deoxidized, the brighter and faster will be the color.

To a vat 8 feet deep by 6 feet wide, filled with water, and heated by steam or otherwise to 140° F., add 200 lbs. of woad, about 10 lbs. of well-ground indigo, — or more, according to the amount of work to be done, — 5 lbs. of soda, $\frac{1}{2}$ a bushel of good wheat-bran, 10 lbs. of good madder, and 1 lb. of flour. If the soda, bran, madder, and flour are boiled for five minutes before adding them to the vat, it will ferment twelve hours earlier than it would otherwise do. Stir the vat well, and after eight hours' rest again stir. The vat by this time should have commenced to ferment, the liquid acquiring a mottled appearance. When the fermentation is well established, add about 2 lbs. of slaked lime, and again stir. If sufficient lime has been added, the surface of the vat will reflect a golden color; and a sample of wool immersed in the liquid for about twenty minutes should become perfectly colored blue in one minute. A green color remaining with the wool after one minute shows that more lime must be added. Should this addition be neglected, the vat will be, as it is termed technically, "*lost*." The lime added should be mixed with water, and the solution filtered. A vat, to which too much lime has been added, or which has become "*over-sharpened*," acquires a brown color, and the wool immersed in the liquor is imperfectly colored a gray-blue. 2 or 3 lbs. of sulphuric acid may be added in such a case to form with the lime a neutral sulphate, which settles to the bottom of the vat. After the addition of the sulphuric acid a mixture of 5 lbs. of bran and 5 lbs. of madder boiled together should be added. Fermentation is thus again set up, and can be reduced by lime as before. When the vat is exhausted, and more indigo must be added, care should be taken that the liquor is sharp enough. The liquor should again be warmed, and the indigo added with about 6 lbs. of madder, 6 lbs. of bran, and 2 lbs. of soda, boiled together as before. The indigo should be added overnight, in order that fermentation may be complete by the morning. In the morning, lime must be added until the golden film forms on the surface of the liquid.

SODA OR POTASH VAT.

By boiling 10 lbs. of indigo in a solution of 4 lbs. of caustic soda or potash, and adding 2 lbs. of feathered tin, or 3 lbs. of tin crystals, the indigo is deoxidized by the strong affinity of the tin for the oxygen. The ordinary method of fermentation is, however, to be preferred, as a larger quantity of work can be got through. But the soda vat is preferable for light blues, as a brighter color is obtained than by the woad vat, while larger quantities

of goods may be colored more easily. Potash should be employed for linen and cotton.

A DECOMPOSED VAT.

A decomposed, or, as it is termed, a "sick" or "green" vat may be known by its dark color and freedom from odor, and more certainly by the addition of lime, bran, madder, and soda, or of woad. If, after several hours, the vat is restored, it may be worked with care as a new vat.

APPLICATIONS OF THE WOAD VAT.

The applications of the woad vat, as well as many practical recipes relating to the coloring of wool, we shall, for facility of reference, include in this chapter.

INDIGO-BLUE ON WOOL FOR TOPPED HOSIERY.

100 lbs. of wool are colored with 4 lbs. of Guatemala or 3 lbs. of Bengal indigo, in the woad or soda vat. There is then prepared by boiling for a few minutes 5 lbs. of cudbear or 8 lbs. of orchil paste, adding to the mixture 1 lb. of soda, or an equivalent quantity (about one pail) of urine. The beck must be cooled to 170° F. before the wool can be entered. It should be handled for twenty minutes, taken out, rinsed, and dried. 3 oz. of aniline purple dissolved in half a pint of alcohol can be used instead of the cudbear. The shade produced is very pretty, but ought never to be used for mixed goods, which have to be bleached, as it runs into whites. The cudbear, too, is affected by sulphuring.

DARK BLUE, FOR WOOL FOR BROADCLOTH.

A healthy woad vat is employed for this color. The wool is handled slowly for one hour, then removed; after two hours it can be again dipped until it has acquired the desired shade. Enough indigo should be added to the vat to color the wool in three immersions; that is, about 10 lbs. of good indigo to 100 lbs. of wool. The wool may with advantage be taken through a warm bath containing 2 lbs. of sulphate of copper; this additional immersion renders the color faster in fulling. A dark blue, very common in the market, is topped with camwood or red sanders, the latter being boiled on the colored wool.

TOPPED LOGWOOD BLUE.

Dip in the blue vat and then rinse. Boil the wool thus dipped for one hour in a kettle containing 10 lbs. of alum, 2 lbs. of crude tartar, and 1½ lbs. of sulphate of copper. Remove and cool. To some fresh water add 5 to 10 lbs. of logwood (according to the shade required, and the quality of the logwood) in a bag. Boil, and then cool the kettle to 170° F. The wool may now be entered and handled slowly; in one hour it may be cooled, rinsed, and switched for drying.

INDIGO-BLUE, PART LOGWOOD.

For 100 lbs. of cloth. Color the cloth in the indigo-blue vat, and rinse well. Then boil the cloth in a bath of 20 lbs. of alum, 2 lbs. of tartar, 5 lbs.

of pensée mordant or purple acid,* for two hours. Remove and cool. To a kettle of fresh water add 10 lbs. of logwood in a bag, boiling for half an hour. Cool to 170° F., and enter the wool, boiling half an hour. Cool and rinse.

PURPLE BLUE.

For 100 lbs. of wool. The wool is first colored lightly in the blue vat. It is then boiled in a solution of 15 lbs. of alum and 3 lbs. of tartar for one and a half hours. Remove, cool, and drain for twenty-four hours. In a kettle of fresh water boil 8 lbs. of cochineal powder for ten minutes. Cool to 170°, and enter the wool for one hour; boil for three-quarters of an hour, rinse and dry.

CHROME BLUE.

For 100 lbs. of wool. Boil the wool for one hour in a solution of 3 lbs. of bichromate of potash, 6 lbs. of alum, 1 lb. of tartar. Remove, cool, and rinse. In a kettle of fresh water boil 6 lbs. of logwood for half an hour, add 3 lbs. of dissolved cudbear. Cool to 180° F., and enter the wool, boiling and handling for three-quarters of an hour. As chrome colors always darken in drying, the shade, on removal from the bath, must be lighter than that desired in the finished fabric.

DARK INDIGO BLUE.

For 100 lbs. of cloth. Boil for one hour and a half in a solution of 20 lbs. of alum, 4 lbs. of tartar, 6 lbs. of pensée mordant, 6 lbs. of extract of indigo. Remove and cool. Prepare a fresh kettle of 8 to 10 lbs. of logwood, in which boil the fabric for one hour.

SAXONY BLUE.

For 100 lbs. of thibet or combed yarn. Dissolve 20 lbs. of alum, 3 lbs. of tartar, 2 lbs. of pensée mordant, 3 lbs. of extract of indigo, or, better, 1 lb. of carmine, in hot water. Cool to 180° F.; enter the material, and boil until the color becomes even. Too long boiling should be obviated by well and quickly handling.

It is necessary to handle coarse carpet-yarn through a beck heated to 170° F., and containing 15 lbs. of alum, 10 lbs. of sulphuric acid, 4 lbs. of chemic paste or sulphate of indigo.† Under the influence of sulphur the color becomes of a stone-green shade, but is restored by rinsing in water.

FAST PRUSSIAN BLUE.

For 100 lbs. of wool or flannel. Dissolve 8 lbs. of red prussiate of pot-

* This mordant can be prepared by mixing in a stone vessel 5 lbs. of tartar, 5 lbs. of feathered tin, with 25 lbs. of muriatic acid. To this mixture is added 15 lbs. of sulphuric acid diluted with 10 lbs. of water; then very slowly 2 lbs. of nitric acid.

† Sulphate of indigo may be roughly prepared thus: To 80 lbs. of sulphuric acid (67° B.), add slowly 10 lbs. of pulverized fine Bengal indigo. Stir until all is well mixed. After two days, add slowly 10 lbs. of water.

ash (ferricyanide of potassium), 2 lbs. of tartaric acid, 2 lbs. of oxalic acid, and the following mordant in water heated to 208° F., in which the goods are to be well handled for one and a half hours. Then remove, allow to drain, rinse, and dry.

The mordant. Add 1 lb. of feathered tin to 10 lbs. of nitric acid (36° B.), 10 lbs. of hydrochloric acid (22° B.), 10 lbs. of sulphuric acid (66° B.), diluted with water.

Some dyers themselves prepare the red prussiate of potash by passing chlorine (obtained by the action of sulphuric acid upon manganese and salt) through a leaden pipe into a solution of yellow prussiate of potash. A dark-olive liquid is produced, which yields on evaporation crystals of red prussiate. When nitrate of iron no longer produces a blue coloration, enough chlorine has been taken up. The olive liquid can be employed without crystallization.

ANILINE BLUE.

For 100 lbs. of fabric. Dissolve 1½ lbs. of aniline blue in 3 quarts of boiling alcohol. Filter the solution, and add the clear filtrate to a bath of water at 130° F., together with 10 lbs. of sulphate of soda, and 5 lbs. of acetic acid. The goods are now to be entered and handled for twenty minutes, when the temperature of the bath is to be slowly raised to 200° F. At this temperature add 5 lbs. of sulphuric acid diluted with water. Boil for twenty minutes, rinse, and dry. The aniline blue should be added in two or three quantities, in order to render the coloring of equal quality throughout. Closely woven fabrics, braid, &c., should be prepared in a boiling solution of 10 lbs. of sulphuric acid and 2 lbs. of tartaric acid before coloring with the aniline.

REDS ON WOOL.

SCARLET.

For 100 lbs. of fabric. Boil for fifteen minutes 11 lbs. of Honduras cochineal, 5 lbs. of tartar, or 3 lbs. of tartaric acid, 2 lbs. of oxalic acid, 1 lb. of tin crystals, 1½ lbs. of flavine, 10 lbs. of muriate of tin (see foot-note, p. 407). Cool to 180° F., and enter the goods, boiling for one hour. Remove, cool, and rinse. 5 lbs. of hydrochloric acid added to the beck will prevent the appearance of undyed filaments of wool, &c. This addition is attended with good results in all kinds of scarlets, orange, and pinks.

SCARLET (LAC-DYE).

For 100 lbs. of flannel or yarn. Boil in water for fifteen minutes 25 lbs. of lac-dye, 15 lbs. of muriate of tin, 5 lbs. of tartar, 1 lb. of flavine (the quantity of which may be varied according to shade), 1 lb. of tin crystals, 5 lbs. of hydrochloric acid. Cool to 170° F., and enter the goods, boiling for one hour. Rinse whilst hot. This is a faster color than

COCHINEAL SCARLET.

For 100 lbs. of fabric. Dissolve in water 10 lbs. of nitrate of tin, 5 lbs. of cream of tartar, and 1 lb. of flavine. Boil the solution for ten minutes,

and cool to 170° F. Enter the goods, boiling for one hour. Remove, cool, and rinse.

To a kettle of fresh water add 7 lbs. of cochineal and 2 lbs. of starch in solution. Strain, and then boil for five minutes. Cool to 180°, and then add 1 lb. of nitrate of tin. Enter the fabric and boil for three-quarters of an hour. Remove, cool, and rinse.

PONCEAU.

For 100 lbs. of fabric. Color scarlet, as for scarlet dyeing, but without flavine or yellow dye-stuff. Then well rinse the goods. Prepare a kettle of fresh water heated to 180°, into which put 5 lbs. of cochineal paste (see p. 404). Stir, and enter the fabric without boiling. Rinse and dry. Magenta crystals may be substituted for the cochineal.

PINK FOR LISTINGS.

For 100 lbs. of wool. Boil together, until dissolved, 8 lbs. of cochineal, 5 lbs. of tartar, 10 lbs. of muriate of tin, $\frac{1}{2}$ lb. of tin crystals. Cool to 170° F., and enter the wool, boiling for half an hour. Should the wool not color evenly, add a few lbs. of hydrochloric acid. If the listings are to be on white flannels, add about 6 lbs. more of muriate of tin to the beck before removing the wool. To prevent the color running, the scourer should add a solution of 1 lb. of hydrochloric acid to the last rinsing of the flannel. Should the cochineal have been smeared upon the white, it should be well rinsed out with cold water before sulphuring.

MADDER RED.

For 100 lbs. of fabric (generally cloth for army uniforms). Dissolve 20 lbs. of alum, 5 lbs. of tartar, 5 lbs. of muriate of tin. Enter the goods; boiling for two hours. Remove, cool, and drain overnight. Into fresh water stir 75 lbs. of good Dutch madder. Enter the fabric at 120° F., and raise the temperature to 200° in one hour. Handle, rinse, and dry.

MAGENTA.

For 100 lbs. of fabric. Dissolve 8 oz. of magenta crystals in boiling water and strain through a flannel sieve. Cool the bath to 170° F., in which handle the fabric half an hour. Varying the quantity of magenta crystals will cause variation in the shade. A few lbs. of soap will aid in securing evenness of color.

CRIMSON WITH COCHINEAL.

For 100 lbs. of thibets. Dissolve 10 lbs. of tartar, 6 lbs. of nitrate of tin, and boil the goods in this solution for two hours. Prepare a fresh bath with 20 lbs. of cochineal paste with water at 170° F.; increase the temperature to 200°. Remove, cool, and rinse.

Where hard water is employed, the color will be very brilliant; in the case of river water, about 3 lbs. of whiting may be added. For Orleans with Turkey-red warps, the coloring should be effected in one operation, the paste, tartar, and nitrate of tin being all added at once. Muriate of tin must not be employed.

ROSE-PINK.

For 100 lbs. of fabric. Dissolve 5 lbs. of alum, 5 lbs. of cream of tartar, 2 lbs. of saleratus, 5 lbs. of muriate of tin, with sufficient cochineal paste to produce the required shade. Handle the fabric at 180° F. This color is faster and better suited for carpetings than that obtained with magenta.

DAHLIA.

For 100 lbs. of wool. Stir 20 lbs. of good cudbear in a little water, straining through a sieve into a clean kettle. Heat the bath to 180°, and then add 2 lbs. of muriate of tin. Enter for one hour without boiling. Rinse and dry.

Crude acetic acid or wood vinegar can be used to obtain fine red shades of peach color, and ammonia or pearl-ash for blue shades. Orchil may be substituted for cudbear. This dye should never be boiled.

MAROON.

For 100 lbs. of wool. Boil 20 lbs. of cudbear, or 25 lbs. of orchil, and 4 oz. of magenta crystals for ten minutes. Cool the dye to 175° F. Enter the fabric or wool, increase the temperature to 212°. Remove, rinse, and dry.

YELLOW.

YELLOW.

For 100 lbs. of wool. Dissolve 15 lbs. of alum, 4 lbs. of cream of tartar, 10 lbs. of muriate of tin, 1 lb. of tin crystals, 2 lbs. of flavine, or 8 lbs. of quercitron bark. Boil until the flavine is dissolved, and cool to 170° F. Enter the wool, and while handling raise the temperature to 212°, then allowing the goods to remain for three-quarters of an hour. Remove, cool, and rinse. Cochineal may be added for dark yellows, omitting the alum if the color approaches orange, as it causes this color to become dull and blurred. A few pounds of sulphuric acid will sometimes increase the brilliancy of the yellow. Picric acid is employed for delicate tints of yellow, and may be made fast by muriate of tin.

BALGE YELLOW.

This color is generally employed on cassimere for vestings. The goods should be previously well bleached by sulphuring.

For five pieces of goods, each of 10 lbs. weight. Dissolve in water, heated to 140° F., 5 lbs. of alum, 2 lbs. of muriate of tin, and the liquor from 3 lbs. of fustic. The tannic acid should be previously eliminated from the fustic by adding $\frac{1}{4}$ lb. of glue to the boiling fustic liquor. Handle the goods until the required shade is obtained.

ORANGE.

For 100 lbs. of wool. Boil for ten minutes 5 lbs. of tartar, 3 lbs. of flavine, 5 lbs. of cochineal, 1 lb. of tin crystals, 10 lbs. of muriate of tin. Cool the kettle to 180° F., and enter the wool for ten minutes. Then, if even, boil for half an hour; if uneven, add 8 lbs. of hydrochloric acid. Rinse and dry.

SALMON.

For 100 lbs. of wool. Boil for ten minutes 10 lbs. of alum, 3 lbs. of tartar, 1 oz. of flavine, 5 oz. of cochineal, 6 lbs. of muriate of tin, 2 lbs. of hydrochloric acid. Cool to 180° F. Enter the wool, handle, and boil until even. Cool and rinse. The shade may be varied by adding more or less cochineal or flavine.

SALMON WITH MADDER.

For 100 lbs. of wool. Dissolve 10 lbs. of alum, 3 lbs. of tartar, 4 lbs. of muriate of tin, 3 lbs. of madder, 4 lbs. of hydrochloric acid. Heat to 170° F., and enter the goods for half an hour, during which time increase the temperature to 212°. The madder being a fast colour, the wool must be handled quickly at first, because longer boiling will not remove patches.

GREENS.**GREEN FOR BROADCLOTH.**

For 100 lbs. of wool. Dissolve 15 lbs. of alum, 3 lbs. of tartar, 3 lbs. of muriate of tin, and 20 lbs. of fustic. The fustic should, of course, be first boiled in water, to which the other constituents of the kettle may be added. The wool should be entered, and the dye raised to slow boiling for about one hour. Remove and cool. Prepare with fresh boiling water 30 lbs. of weld as a bath, to which add 3 lbs. of soda. Cool to 180° F., and enter the prepared wool, allowing it to remain for one hour; but the bath must not be brought to the boil. Remove. The wool is now colored a fine yellow, and is finished with indigo in the blue vat.

This mode of coloring is expensive, but the results are good.

ANOTHER GREEN FOR BROADCLOTH.

For 100 lbs. of wool. Color well in the blue vat. Dissolve 15 lbs. of alum, 2 lbs. of tartar, 2 lbs. of sulphate of copper, in which bath boil the wool for one hour. Prepare a fresh kettle by boiling 25 lbs. of fustic and 8 lbs. of logwood in water. Cool to 180° F., and enter the prepared wool, handling well for ten minutes; then increase the temperature to 212° for half an hour. Remove and cool. The color may be tested by hand-fulling with strong soap.

LOGWOOD GREEN.

This color is a common one, better suited to coarse cloth. For 100 lbs. of broadcloth. Boil the cloth for one hour in a solution of 15 lbs. of alum, 3 lbs. of tartar, 2 lbs. of sulphate of copper. Remove and cool. Boil in fresh water for half an hour 15 lbs. of fustic and 10 lbs. of logwood, into which bath, at a temperature of 180°, reel the cloth for one hour, and then expose it to the air. During the airing run off half the liquor, and reduce the temperature to 130°. Then add the solution of 2 lbs. of pearl-ash, or of 3 lbs. of soda-ash, or 4 pails of urine. Reel the cloth for twenty minutes and wash. If darker shades should be desired, more logwood may be employed.

CHROME GREEN.

For 100 lbs. of wool. Dissolve 4 lbs. of bichromate of potash, 10 lbs. of alum, and 2 lbs. of tartar in a kettle of fresh water, in which boil the wool for one hour. Remove, cool, and rinse. Prepare an infusion of 20 lbs. of fustic and 10 lbs. of logwood. Cool to 180°, and enter the prepared wool, boiling for half an hour. Cool, and rinse. This color darkens in drying and finishing, and is not very durable.

GREEN FOR YARN.

For 100 lbs. of yarn. Dissolve by boiling 20 lbs. of alum, 8 lbs. of sulphuric acid, 3 lbs. of extract of indigo, 1 lb. of picric acid. Cool to 180° F., and enter the yarn, bringing the bath, after quickly handling the wool, to a boil. The addition of a few pounds of common salt will assist in rendering the color even, especially if the yarn be spun of new wool.

ANILINE GREEN.

The crystals of aniline green are red-colored in dry state; the color is not so brilliant from aniline crystals that have been kept even a short period of time. The dye is, therefore, best prepared immediately before use; and the following method may be adopted, as recommended by Dr. Reimann ("Handbook of Aniline Colours," pp. 77 to 193). 8 lbs. of magenta crystals are mixed with 3 lbs. of sulphuric acid and 1 lb. of water. To this solution, when cold, 1½ lbs. of aldehyde are added, and the whole well mixed upon a water-bath until the liquid, when dropped into acidulated water, exhibits a fine blue color. The solution may then be poured into 8 gallons of boiling water, to which is added the solution of 3 lbs. of hyposulphite of soda. Boil this liquid for a few minutes, and filter through a cotton cloth. A fine green dye passes through the filter as the filtrate, and a dark blue-gray residue remains. Colored silk with aniline green, when exposed to 300° of dry heat, changes to blue; but colored wool suffers no change.

ANILINE GREEN WITH PICRIC ACID.

For 100 lbs. of woollen goods. First color with aniline blue, as described under Blue. Remove the cloth or yarn, and add 1 lb. of picric acid and 6 lbs. of alum to the dye. When the solution is complete, enter the woollens, boil for twenty minutes, cool, and rinse. This green is not so fast nor so bright as the former.

OLIVE GREEN.

This color is chiefly used for broadcloths. For 100 lbs. of wool. Dip first in the blue vat. Then prepare a kettle by boiling 20 lbs. of fustic and 10 lbs. of logwood; to the infusion add 10 lbs. of alum, 2 lbs. of tartar, 2 lbs. of sulphate of copper, 10 lbs. of madder, 10 lbs. of turmeric. Boil for ten minutes, and then cool the dye to 180° F. Enter the blueed wool, handling well for ten minutes, and boiling for one hour and a half. The shade may be varied by the addition of more or less logwood or madder.

OLIVES.

BICHROME OLIVE.

For 100 lbs. of wool. Boil the wool for one hour in a kettle in which has been dissolved 2 lbs. of bichromate of potash, 2 lbs. of tartar, and 5 lbs. of alum. Remove, cool, and rinse. Prepare by boiling for ten minutes a kettle of 20 lbs. of fustic, 5 lbs. of logwood, and 20 lbs. of madder. Cool to 180° F., and enter the prepared wool. After well handling, boil slowly for half an hour, adding a solution of 2 lbs. of sulphate of copper. Cudbear, camwood, or peaewood, may be used instead of madder. Turmeric is too fugitive to be employed with chrome colors.

A CHEAP OLIVE.

For 100 lbs. of wool. Boil for one hour 80 lbs. of fustic, 6 lbs. of logwood, and then add 10 lbs. of sumach, 5 lbs. of madder, 10 lbs. of red sanders, and 3 lbs. of tartar, boiling for ten minutes. Cool to 180° F., and enter the wool, boiling for one hour. Then add a solution of 2 lbs. of sulphate of copper, again boiling slowly for half an hour. Darken with 5 lbs. of copperas. When the wool has become even, cool the dye and add two pails of urine.

OLIVE ON ZEPHYR.

For 100 lbs. of yarn. First boil the yarn for one hour in a solution of 20 lbs. of alum, 5 lbs. of tartar, and 2 lbs. of sulphate of copper. Various shades may be obtained upon the prepared wool with fustic, turmeric, orchil, extract of indigo, and picric acid.

BROWNS.

CHROME BROWN.

For 100 lbs. of fabric. Boil for one hour in a bath of 2 lbs. of bichromate of potash and 5 lbs. of tartar. Then prepare a fresh kettle with 10 lbs. of peachwood, 1 lb. of logwood, and 1 lb. of tartar, boiling for ten minutes. Cool to 175° F., entering and boiling the fabric for half an hour. The above proportion of tartar and chrome should be strictly adhered to, in order that the color may become even.

CHROME RED-BROWN.

Prepare as for chrome brown. Then produce the desired shade by means of fustic or picric acid. Evenness can be attained by employing sufficient tartar.

CAMWOOD BROWN.

For 100 lbs. of wool. Boil until thoroughly incorporated 100 lbs. of camwood, 20 lbs. of sumach, 5 lbs. of logwood, and 2 lbs. of tartar. Cool to 190° F., boiling the wool, after careful handling, for one hour. Add a solution of 2 lbs. of sulphate of copper, again boiling for half an hour. Darken with a solution of 6 lbs. of copperas; and, to obtain a deeper shade, add 3 pails of urine. Remove and cool quickly.

FAST BROWN.

For 100 lbs. of wool. Boil for a few minutes 15 lbs. of camwood, 30 lbs. of madder, 10 lbs. of fustic, 15 lbs. of sumach, 5 lbs. of logwood, and 2 lbs. of tartar. Cool, and enter the wool, boiling for one hour, adding afterwards 2 lbs. of sulphate of copper. Darken with 6 lbs. of copperas, and deepen with 8 pails of urine, or with soda.

Another fast brown, but more expensive than the former, may be colored by the following method. For 100 lbs. of wool: Dissolve 20 lbs. of alum, 3 lbs. of tartar, and 6 lbs. of muriate of tin, and boil the wool for ten minutes in the solution, allowing it to remain overnight. To a kettle of fresh water at 140° F., add 100 lbs. of madder; and handle the wool in this bath for one hour and a half, boiling for twenty minutes. Remove, cool, and rinse, finishing to the required shade in the blue vat.

LIGHT BROWN.

For 100 lbs. of wool. Boil 15 lbs. of fustic, 10 lbs. of madder, 12 lbs. of camwood, 2 lbs. of tartar, for ten minutes. Cool to 180°, and enter the wool, handling well. Boil for one hour; and add 1½ lbs. of sulphate of copper. Boil again for twenty minutes; and darken with 2 lbs. of copperas.

Browns on wool should never contain an excess of chrome or peachwood.

BISMARCK.

For 50 lbs. of fabric. Dissolve 10 lbs. of alum, 2 lbs. of sulphuric acid, 2 oz. extract of indigo, 1 oz. of fustic, 3 oz. of madder. Cool and enter the fabric. Boil for half an hour. Remove, cool, and rinse. Pass the fabric next through a cold bath of 3 lbs. of peachwood, 5 lbs. of fustic, and ¼ lb. of logwood, with 8 lbs. of dissolved alum. Cudbear, orchil, or magenta and picric acid may be substituted for the madder, sometimes with the advantage of greater evenness of color.

ANILINE BISMARCK.

For 50 lbs. of part cotton fabric. Dissolve 1½ oz. of aniline brown in boiling alcohol. Enter the goods at 170° F., and handle until even; then color the cotton as for cotton warps. A bath of strong alum water, sulphuric acid, cudbear, indigo-extract, fustic, or picric acid will yield a good Bismarck with mousselines or thibets.

On zephyr, Bismarck of any desired shade may be obtained according to the following method, by varying the strength of the red, blue, and yellow dye materials: For 100 lbs. of yarn. Boil the yarn for one hour in a bath of 20 lbs. of alum and 5 lbs. of crude tartar. Add a small quantity of sulphuric acid, cudbear, fustic, or picric acid, and indigo-extract; ½ lb. of cudbear, 5 lbs. of fustic, and 1 oz. of indigo-extract are in good proportion.

MODE WITH INDIGO BOTTOM.

For 100 lbs. of wool. Color lightly with indigo-blue. Prepare a beck at 180° F., with 2 lbs. of tartar, 15 lbs. of fustic, 6 lbs. of cudbear, and 8 lbs. of madder. Enter the wool and boil for one hour. Darken with copperas, or deepen with sulphate of copper.

MODE WITHOUT INDIGO.

For 100 lbs. of wool. Prepare a bath with 2 lbs. of tartar, 5 lbs. of sumach, 1 lb. of logwood, 4 lbs. of fustic, 2 lbs. of cudbear, and 5 lbs. of madder. Enter the wool at 180° F., boiling slowly for one hour. Darken with 2 lbs. of copperas, boiling for twenty minutes. Remove and expose to the air; cool for half an hour and rinse. Smaller quantities of dye-stuff in the same proportion to each other will yield lighter colors.

DRABS AND SLATES.

DRAB.

For 100 lbs. of wool. Dissolve 2 lbs. of tartar, 5 lbs. of camwood, 3 lbs. of sumach, 3 lbs. of fustic, and 1 lb. of logwood. Enter the wool at 180° F., boiling for one hour. Then add 3 lbs. of copperas in solution, and again boil for twenty minutes. Cool, expose to the air, and rinse.

Another drab may be obtained with a bath of 2 lbs. of tartar, 1 lb. of madder, 1 lb. of camwood, 1 lb. of cudbear, 1 lb. of fustic, 1 lb. of logwood, and 1 lb. of sumach. Proceed to darken, air, and rinse as before.

SLATE.

For 100 lbs. of wool. Prepare a bath with 2 lbs. of tartar, 2 lbs. of sumach, 3 lbs. of logwood, and 2 lbs. of cudbear. Enter the wool at 180° F., and boil slowly for one hour. Darken with a solution of 3 lbs. of copperas. After twenty minutes remove, air, and rinse,

PURPLE SLATE.

For 100 lbs. of wool. Prepare a bath with 2 lbs. of tartar, 3 lbs. of sumach, 1½ lbs. of logwood, and a hot alcoholic solution of 2 oz. of aniline purple. Enter the wool at 180° F., and boil slowly for one hour. Darken with 2 lbs. of copperas. Handle, cool, rinse, and dry.

STONE COLOR.

For 100 lbs. of wool. Prepare a bath with 2 lbs. of tartar, 4 lbs. of sumach, 1 lb. of logwood, 5 lbs. of fustic, and 2 lbs. of madder. Boil the wool slowly for one hour; darken with 3 lbs. of copperas.

SILVER GRAY.

For 100 lbs. of wool. Prepare a bath with 1 lb. of crude tartar, ¼ lb. of nut-galls, ¼ lb. of cudbear, and ¼ lb. of logwood. Enter the wool at 180° F., handling well. Then increase the temperature to 200° F. for one hour; cool and darken with copperas. When even, remove, air, and rinse.

LAVENDER.

For 50 lbs. of fabric (thibets or zephyr). Prepare a bath, at a temperature of 180°, with 5 lbs. of alum, 5 lbs. of cream of tartar, 6 oz. of indigo-extract, 6 oz. of cochineal paste. Enter the cloth and boil until even. If the thibets are of mixed silk, the silk will remain uncolored; it may be dyed red by substituting cudbear or orchil for the cochineal paste; or the wool may be colored mode and the silk a golden yellow by employing cud-

bear and turmeric instead of fustic and cochineal. Sulphuric acid instead of tartar; cudbear or orchil instead of cochineal paste, are more economical in the case of coarser goods without silk.

PURPLES.

ANILINE PURPLE.

For 100 lbs. of wool. Dissolve 12 oz. of Perkin's purple in 1 quart of hot alcohol, straining the solution through a flannel sieve. Add 4 lbs. of acetic acid, 4 lbs. of alum, and 1 lb. of tartar. Enter the wool at 175° F., and after handling, bring the bath to a boil for one hour. Should a blue shade be desired, add 3 lbs. of diluted sulphuric acid; if a red shade, the following method is to be preferred: 12 oz. of Perkin's purple, dissolved and strained as before (Hofmann's purple does not require alcohol). Add separately 2 oz. of magenta and 4 lbs. of acetic acid. Enter at 170° F., handling quickly at first.

BLACKS.

CHROME BLACK.

For 100 lbs. of wool or fabric. Dissolve 2½ lbs. of bichromate of potash and 2 lbs. of argol. Boil the fabric or wool in this solution for one hour. Cool and rinse.

Boil in fresh water 25 lbs. of logwood and 10 lbs. of fustic, adding ½ lb. of argol, ¼ lb. dilute sulphuric acid. Enter the prepared wool. Boil for three-quarters of an hour. Remove, cool, and rinse. For orleans and lastings with colored warps, the sulphuric acid must be omitted. A blue-black may be obtained by omitting the fustic and some of the logwood.

SUMACH BLACK.

For 100 lbs. of cloth. Dissolve 40 lbs. of sumach and 2 lbs. of argol. Enter the fabric, boiling slowly for one hour. Remove the fabric, and add to the beck 6 lbs. of copperas and 2 lbs. of sulphate of copper. Enter at 190° F. for half an hour. Remove and air. Cool the dye to 150° F., and add a solution of 4 lbs. of soda-ash. Run through for fifteen minutes, remove, and rinse. This dye upon broadcloth will take colors from the printing block, and may be discharged during steaming if oxalic acid is mixed with the colors.

FAST BLACK.

This color prepared without iron, copper, chrome, or logwood is not suited to common goods, but is adapted for application to mixed goods, such as hosiery. Color the fabric with lac-scarlet. Then pass it through a warm bath of weak soda-lye (about 5 lbs. of soda). Rinse, and finish in the indigo-vat until black, — 6 lbs. of indigo to 100 lbs. of fabric.

CHEAP BLACK.

For 100 lbs. of cloth. Boil in a bag for half an hour 25 lbs. of logwood and 10 lbs. of fustic, and to the bath add 3 lbs. of blue vitriol, 1 lb. of tartar,

and $\frac{1}{2}$ lb. of hydrochloric acid. Enter the cloth, boil for one hour, and then pass through a warm solution of 5 lbs. of soda. The dye is very fugitive.

BLACK FOR SILK-STRIPED THIBETS.

For 5 pieces of fabric, each piece weighing 10 lbs. Dissolve 5 lbs. of copperas, 1 lb. of sulphate of copper, 2 lbs. of tartar, $1\frac{1}{2}$ oz. of chloride of tin crystals, or 3 ozs. of oxychloride of tin.* Enter the fabric over a reel, and boil for one and a half hours. Remove, cool, and rinse. Prepare a fresh bath with 25 lbs. of logwood. Cool to 180° F., and enter the prepared goods, handling them quickly. Cool to 130°, adding 2 lbs. of liquor ammonia. After fifteen minutes, rinse and dry.

COLORS ON WOOL AND WARPS.

SLATES AND MODES ON WHITE WARPS.

For 15 pieces of goods, each piece weighing 10 lbs. Dissolve 20 lbs. of alum, 15 lbs. of sulphuric acid, 2 lbs. of extract of indigo, 6 lbs. of cudbear, 1 oz. of aniline purple dissolved in hot alcohol. Cool to 180° F., and enter the fabric, reeling for one hour, and raising the temperature to boiling. Remove and rinse. Then reel through a cold bath of 50 lbs. of sumach for half an hour, and afterwards through a cold bath containing a solution of 10 lbs. of copperas, 2 lbs. of sulphate of copper, and 2 lbs. of nitrate of iron. Remove and rinse.

MAGENTA ON COTTON WARPS.

For 50 lbs. of fabric. First color with the magenta as for wool. Then take the fabric through a cold bath of 2 lbs. of nut-galls, handling for twenty minutes. Dissolve $1\frac{1}{2}$ oz. of magenta crystals, adding the solution to a cold bath. Enter the goods fresh from the nut-galls; handle for half an hour. Rinse and dry.

PURPLE ON COTTON WARPS.

For 50 lbs. of fabric. Color first a light purple, and then pass through a bath containing 2 lbs. of nut-galls. Dissolve 2 oz. of aniline purple in alcohol, and with it prepare a cold bath. Enter the goods. Reel quickly at first, then slowly for half an hour.

SCARLET ON COTTON WARPS.

For 50 lbs. of fabric. Color first scarlet as for wool. Then pass through a cold bath containing a large quantity of sumach for half an hour, and afterwards through a solution of 8 lbs. of nitrate of tin. Have the mordant as little diluted as possible, and handle for ten minutes. Then take the fabric through a cold bath of 8 lbs. of alum and 5 pails of fustic liquor, to which add 1 lb. of whiting or chalk. Afterwards pass through a cold bath containing 25 lbs. of peachwood.

SAXON BLUE ON COTTON WARPS.

For 50 lbs. of fabric. Color first as for wool. Then handle for fifteen

* Obtained by passing chlorine through a solution of muriate of tin.

minutes in a cold bath containing 3 lbs. of nitrate of iron and 2 lbs. of muriate of tin. In a fresh kettle dissolve 1 lb. of yellow prussiate of potash, to which add 2 lbs. of sulphuric acid. Enter cold, and pass again through the mordant. Rinse and dry.

ANILINE BLUE ON COTTON WARPS.

For 50 lbs. of fabric. Color first as for wool. Then color the cotton with the prussiate of potash and the nitrate of iron alternately, until the desired shade is obtained.

BLACK AND ORANGE ON COTTON WARPS.

For 50 lbs. of black wool with white warps. Run 10 lbs. of the cloth at a time through a cold beck of 10 lbs. of acetate of lead, previously boiled for twenty minutes with 5 lbs. of litharge. Thence take each 10 lbs. through a cold weak lime bath, and again through a warm bath containing 10 lbs. of bichromate of potash. Again through weak lime water. In coloring orange on cotton, it should always be borne in mind that the fabric should not be taken directly from the lead beck into the chrome in order to prevent the occurrence of bleared stripes.

GREEN ON WHITE WARPS.

For 50 lbs. of fabric. First color the wool green as for yarn. Then color the warp with Saxony blue, passing the blue fabric through a beck containing 10 lbs. of alum and 10 lbs. of fustic liquor. For an intensely yellow shade, citron bark or turmeric may be added.

RANDOMS, OR CLOUDED YARNS.

On the large scale the random yarns are colored in machines, but the following method can be recommended for coloring in the ordinary manner: The yarn is first scoured with soap and bleached, and 15 to 20 lbs. are parted off into handfuls of about 1 lb. of yarn each. The yarn thus mechanically prepared is laid in a bath of water, slightly acidified with muriate of tin to neutralize the small quantity of alkali still remaining in the yarn.

SCARLET RANDOM.

A kettle should be prepared of the following dimensions: 5 feet in length, 2 feet 2 inches in width, and 7 inches in depth, made of copper thickly tinned. The bath may be heated by steam or by fire. The kettle should be filled with water to within 2 inches of the rim, and the water raised to a boil. Then add $1\frac{1}{2}$ lbs. of ground cochineal, 2 oz. of flavine, $\frac{1}{2}$ lb. of tartar, 3 lbs. of scarlet spirit (muriate of tin), and 2 oz. of tin crystals. Boil for five minutes, then remove the source of heat. The height of the liquid in the kettle should be adjusted to the depth of dye required upon the yarn; if the level of the dye is low, there will be much white and little scarlet; if high, much scarlet and little white.

The yarn must now be hung upon sticks in the following manner: The kettle being 26 inches wide, the sticks, to bear fairly on the rim, should

be at least 30 inches long, $\frac{3}{4}$ inch broad, and $\frac{1}{4}$ inch thick. Taking two sticks in his right hand and one handful of the soaked yarn in his left, the dyer hangs it upon the sticks, skein by skein; he then grasps one of the sticks in the middle of its length, and allows the other to remain supported by the yarn. The upper stick is then placed against two pegs $2\frac{1}{2}$ inches from another pair of pegs, each peg of the pair being 26 inches from the other. The yarn being drawn from the upper stick, a second stick is laid on the nearer side of the nearer pair of pegs, the yarn being then carried back to the more distant pair of pegs, and there secured by another stick. The yarn, thus folded backward and forward, is thoroughly wetted with cold water, and is then immersed in the kettle. All the contents of the sticks may be handled at one time, by means of a pole passed under the whole series of sticks. After twenty minutes the yarn will be a good scarlet, and may be taken out and rinsed. The rinsing water should be allowed to flow down upon the yarn, so that the dye may not be carried on to the whites. By this method one man can color 150 lbs. of yarn daily, without assistance.

ORANGE RANDOM.

The yarn should be scoured as for scarlet. The kettle is prepared with $\frac{1}{2}$ lb. of flavine, $\frac{1}{2}$ lb. of tartar, 2 lbs. of muriate of tin, 2 oz. of tin crystals, 6 oz. of cochineal, and the bath is raised to the boiling-point for ten minutes before the wet yarn is entered. In twenty minutes remove and rinse.

SAXON BLUE RANDOM.

Prepare the kettle with 6 oz. of extract of indigo, 2 lbs. of alum, 1 lb. of sulphuric acid, and $\frac{1}{2}$ lb. of muriate of tin. Raise the temperature to 190° F., and then remove the source of heat. Enter the wet yarn. The yarn may be bleached after coloring, being well rinsed after removal from the sulphur-house.

PRUSSIAN BLUE RANDOM.

The yarn must be unbleached. Soak the yarn in the dilute muriate of tin bath; and prepare the kettle with $\frac{1}{2}$ lb. red prussiate of potash (to every 15 lbs. of yarn), adding $\frac{1}{2}$ lb. of sulphuric acid and 1 lb. of muriate of tin. Heat to 120° F., and enter the yarn, raising the bath to the boiling-point in the course of an hour. Remove, cool, and expose to the oxygen of the atmosphere for several hours; then rinse. Should the yarn show green spots, a few minutes' steaming will remedy the defect.

MAGENTA RANDOM.

Half an ounce of magenta crystals (to 20 lbs. of unbleached yarn) dissolved in a bath heated to 170° F. Treat as for Saxon blue; rinse quickly, and bleach in the sulphur-house. Rinse again in cold water.

PURPLE RANDOM.

For 20 lbs. of yarn. Soak the yarn in water acidified with sulphuric acid (1 lb. of acid to 6 pails of water). Then enter it in a bath containing $\frac{1}{4}$ oz. of aniline purple dissolved in hot alcohol, to which is added 1 lb. of acetic

acid. Heat to 160° F., and enter the yarn in one lot. The yarn should be bleached after coloring.

WOOLLEN GOODS.

Receipts for producing the usual colors on goods composed entirely of wool may be conveniently given here.

No. 1. *Black (Block).*—

Calcined starch	10 lbs.
Logwood liquor, at 21° Tw.	5½ quarts
Water	14½ „
Sapan liquor, at 20° Tw.	1½ pints
Red liquor, at 10° Tw.	5 quarts
Nitrate of copper (crystals)	3½ lbs.
Nitrate of iron, at 80° Tw.	2½ quarts
Iron liquor, at 14° Tw.	1½ „

No. 2. *Black (Blotch).*—

Logwood liquor, at 6° Tw.	9 quarts
Sapan liquor, at 6° Tw.	9 „
Starch	2½ lbs.

Boil, and add before cooling—

Sulphate of copper	¾ lb.
Sulphate of iron	½ „
Extract of indigo	¾ „

When cold add—

Nitrate of iron, at 80° Tw.	1½ lbs.
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No. 3. *Black (for French Merinos).*—

Logwood liquor, at 10° Tw.	6½ quarts
Orchil liquor, at 10° Tw. (blue shade)	2 „
Starch	2½ lbs.
Gall or myrobalan liquor, at 20° Tw.	¾ pint

Boil, and add—

Copperas	2 oz.
Sulphate of Copper	2 „
Extract of indigo	12 „

When cold add—

Nitrate of iron, at 8° Tw.	15 „
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No. 4. *Black (for Objects).*—

Boiling water	1 gal.
Sapan liquor, at 22° Tw.	½ „
Logwood liquor, at 48° Tw.	1 „

Then add by degrees—

Water	½ „
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In which has been dissolved—

Bichromate	¾ lb.
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Thicken with—

Starch	3½ lbs.
Gum-substitute	4 „

Add while hot—

Sal-ammoniac	1½ „
Verdigris	2½ „

When partially cool add—

Oxalic acid	1½ „
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Mix intimately with—

Oil of turpentine	¼ pint
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When quite cold add—

Nitrate of iron, at 90° Tw.	3½ lbs.
Extract of indigo	8½ „

No. 5. *Black (both for Blotch and Objects).*—

Logwood liquor, at 5° Tw.	1 quart
Starch	4 oz.

Boil, and add when cold—

Nitrate of iron, at 80° Tw.	4 „
Nitrate of copper, at 80° Tw.	1 „
Gall liquor, at 5° Tw.	5 „

No. 6. *Black.*—

Logwood liquor, at 5½° Tw.	1 quart
Gall liquor, at 8° Tw.	1 gill
Orchil liquor	5 oz.
Starch	6 „

Boil, and add while warm—

Extract of indigo	2½ „
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When cold add—

Nitrate of iron	7½ „
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No. 7. *Blue, Dark.*—

Starch	12 oz.
Water	1 gal.

Boil, and while still hot work in—

Extract of indigo	1½ lbs.
Tartaric acid	4 oz.
Oxalic acid	6 „
Alum	10 „

No. 8. *Blue, Dark (another shade).*—

Extract of indigo	9 oz.
Alum	12 „
Oxalic acid	4½ „
Cochineal liquor, at 6° Tw.	7½ „
Gum-water	1½ gals.

The depth of the shade can of course be easily modified by an increase or

decrease of the gum-water, and the blue can receive a bloomier tone, if required, by a slight increase of the cochineal.

No. 9. *Blue, Royal.*—

Oxalic acid	$\frac{1}{2}$ lb.
Alum	6 $\frac{1}{2}$ oz.
Water	$\frac{1}{2}$ gal.
Gum	3 $\frac{1}{2}$ lbs.

When cold add —

Perchloride of tin	4 oz.
Red prussiate	20 „
Nitrate of iron, at 80° Tw.	13 „

No. 10. *Brown, Maroon.*—

Bark liquor, at 18° Tw.	1 quart
Cochineal liquor, at 5° Tw.	1 „
Gum	1 lb.
Oxalic acid	$\frac{1}{4}$ „
Alum	3 oz.
Bichloride of tin, at 100° Tw.	5 „
Extract of indigo	1 $\frac{1}{2}$ „

No. 11. *Brown.*—

Bark liquor, at 18° Tw.	2 $\frac{1}{2}$ gals.
Orchil liquor, at 11° Tw.	1 gal.
Cochineal liquor, at 6 Tw.	2 $\frac{1}{2}$ gals.
Starch	4 $\frac{1}{2}$ lbs.

Boil and add —

Alum	18 $\frac{1}{2}$ oz.
Oxalic acid	8 $\frac{1}{2}$ „
Perchloride of tin	21 „
Extract of indigo	4 $\frac{1}{2}$ „

No. 12. *Brown.*—

Berry liquor, at 18° Tw.	1 quart
Orchil liquor, at 18° Tw.	1 „
Starch	1 lb.

Boil and add —

Alum	4 oz.
Tartaric acid	2 „
Copperas	2 „

No. 13. *Buff.*—

Bark liquor, at 4° Tw.	1 gal.
Orchil liquor, at 22° Tw.	$\frac{1}{2}$ „
Alum	1 $\frac{1}{2}$ lbs.

No. 14. *Chocolate, Dark.*—

Orchil liquor, at 16° Tw. (blue)	1 $\frac{1}{2}$ gals.
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Alum	12 oz.
Sal-ammoniac	2 „
Oxalic acid	2 „
Stir till the mixture ceases to froth, and add —	
Starch	16½ „
Calcined starch	16½ „
And add —	
Extract of indigo	6 „
No. 15. <i>Chocolate, Medium.</i> —	
Orchil liquor, at 16° Tw.	2 quarts
Gum-water	2 „
Extract of indigo	1 oz.
No. 16. <i>Chocolate, Reddish.</i> —	
Orchil liquor, at 16° Tw.	1 gal.
Ammoniacal cochineal paste	7½ oz.
Alum	4 „
Oxalic acid	1 „
Sal-ammoniac	4 „
Stir well till it ceases to froth, strain, and add —	
Starch	1 lb.
Extract of indigo	3 oz.
No. 17. <i>Green, Dark.</i> —	
Bark liquor, at 17° Tw.	1½ gals.
Extract of indigo	3 lbs.
Sal-ammoniac	3 oz.
Sulphate of alumina	1½ lbs.
Dissolved in —	
Water	3 pints
Tartaric acid	10 oz.
Oxalic acid	7 „
Cool down and add —	
Perchloride of tin	10 „
Yellow prussiate	4 „
Gum substitute, according to the pattern.	
No. 18. <i>Green, Dark.</i> —	
Bark liquor, at 16° Tw.	2 gals.
Extract of indigo	1½ lbs.
Alum	1 lb.
Gum, powdered	8 lbs.
Heat and add —	
Tartaric acid	8 oz.
When cold add —	
Oxalic acid	2 „
Perchloride of tin, at 100° Tw.	½ lb.

No. 19. *Green, Lighter.*—

Fustic yellow, at 12° Tw.	1 gal.
Extract of indigo	$\frac{1}{2}$ lb.
Alum	1 $\frac{1}{2}$ lbs.
Tartaric acid	6 oz.
Oxalic acid	8 „
Gum-water	2 gals.
Perchloride of tin, at 100° Tw.	$\frac{1}{2}$ lb.

For the brightest greens, berry-liquor is generally employed as the yellow constituent. Small amounts of cochineal liquor are occasionally added to give more bloom and brightness to the blue constituent.

No. 20. *Gray, Dark.*—

Strong ammoniacal cochineal liquor	2 gals.
White tartar	1 lb.
Alum	8 oz.
Extract of indigo	8 „
Berry liquor, at 7° Tw.	1 $\frac{1}{2}$ quarts

Thickening according to the pattern. For lighter shades, reduce with gum-water, and increase the proportion of the acids.

No. 21. *Pearly Gray.*—

Extract of indigo	$\frac{3}{4}$ lb.
Boiling water	6 gals.
Tartaric acid	2 lbs.
Alum	2 „
Ammoniacal cochineal paste	1 $\frac{1}{2}$ „
Gum-water	8 gals.
Perchloride of tin, at 100° Tw.	1 $\frac{1}{2}$ lbs.

No. 22. *Gray, Dark.*—

Logwood liquor, at 6° Tw.	1 gal.
Nitrate of iron, at 89° Tw.	10 oz.
Gum-water	1 gal.

No. 23. *Lilac.*—

Ammoniacal cochineal liquor	$\frac{1}{2}$ gal.
Acetic acid (weak)	1 quart
Alum	10 oz.
Oxalic acid	8 „
Perchloride of tin	2 lbs.
Extract of indigo	6 oz.
Gum-water	2 gals.

No. 24. *Orange.*—

Bark liquor, at 17° Tw.	2 gals.
Cochineal liquor, at 3° Tw.	1 gal.
Gum	6 $\frac{1}{2}$ lbs.

Oxalic acid	10 oz.
Perchloride of tin	1 lb. 5 oz.

No. 25. *Pink.* —

Ammoniacal cochineal paste	1 lb.
Cochineal in fine powder	1 „
Water	2 gals.

Boil down to $1\frac{1}{2}$ gallons, and add —

Oxalic acid	6 oz.
Perchloride of tin	12 „
Gum-water	2 gals.

No. 26. *Yellow.* —

Berry liquor, at 11° Tw.	1 gal.
Tin crystals	14 oz.
Gum	5 lbs.

No. 27. *Yellow.* —

Bark liquor, at 18° Tw.	1 gal.
Orchil liquor, at 11° Tw.	1 lb.
Alum	6 oz.
Tartaric acid	2 „
Oxalic acid	2 „
Gum	3 lbs.
Perchloride of tin, at 108° Tw.	6 oz.

No. 28. *Orange-Yellow.* —

Berry liquor, at 15° Tw.	2 gals.
Starch	3 lbs.

Boil, and mix with—

Alum	$1\frac{1}{2}$ lbs.
Tin crystals	1 lb.
Oxalic acid	6 oz.

No. 29. *Black on Woollen Yarn.* —

Extract of logwood (solid)	6 lbs.
Boiling water	$10\frac{1}{2}$ pints

Dissolve, let cool and settle, and add the clear liquid to —

Iron liquor, at 7° Tw.	1 lb.
Nitrate of iron, at 88° Tw.	$\frac{1}{4}$ „
Gum tragacanth	$\frac{1}{2}$ „

The amount of gum is subject to modification as the case may require. The pieces, when printed, are exposed to the air for six hours, steamed for forty-five minutes, rinsed, and dried.

No. 30. *Brown on Woollen Yarn.* —

Extract of peachwood (solid)	2 lbs.
Extract of bark (solid)	1 lb.
Boiling water	$10\frac{1}{2}$ pints

Cool, let settle, and thicken with —

Gum tragacanth	1 lb.
Red' liquor, at 7° Tw.	1 „

Mix thoroughly, and proceed as above. If a darker shade is required, iron liquor is added.

No. 31. *Bismarck for Woollen Yarn.* —

Bismarck brown (according to shade)	1 oz.
Boiling water	10½ pints

Cool, settle, and thicken with —

Gum tragacanth	2½ oz.
Starch	2½ „
Glue	1½ „

After printing, age for six hours and steam at 190° F.

No. 32. *Ponceau for Woollen Yarn.* —

Ground cochineal	1 lb.
Water	10½ pints

Boil and strain; exhaust the residue with further portions of water, mix the extracts, concentrate to 10½ pints; cool, and let settle. In the clear liquor dissolve —

Oxalic acid	5 oz.
Tin crystals	2½ „

Thicken with —

Wheat starch	1 lb.
White glue	1 „

Print, steam at 190° F., and rinse.

No. 33. *Scarlet for Woollen Yarn.* —

The mixture is the same as for ponceau, but from ¼ to 1½ oz. of extract of fustic, previously dissolved in water, is added.



THE HAIR-CLOTH MANUFACTURE.

A RECENT visit of the editor to Pawtucket, R. I., gave him the opportunity of observing a new and characteristic branch of the textile industry, and of witnessing a fresh and most interesting illustration of the benefits of the "national system" of political economy. The industry which we refer to is the manufacture of furniture hair-cloth by power, as conducted by the Pawtucket Hair-cloth Company. The company has a capital of \$500,000; employs 150 operatives in a handsome mill, situated in the heart of the town, and turns out an annual product of many hundred thousand dollars value. Its immediate managers are Mr. Henry D. Metcalf, a native

of Boston, who conducts the commercial operations; and Mr. H. Littlefield, a native of Rhode Island, an experienced textile manufacturer and engineer, who attends to the production of the fabric.

The chief material of this fabric is horse-hair, furnished solely from the tails of horses, the hair of the mane or of other animals for this purpose being useless. The horse-hair composes the weft, the warp consisting of stout cotton thread. The texture is like that of satinete. It is a feature worthy of note in this establishment, that the thread is made in adjoining mills in the same town; and the excellence of the thread is assured by the accountability which results from the consumer and producer being placed in contiguity. More than half of the horse-hair is obtained abroad, the principal source of supply being Siberia in Russia. To make these arrangements for supply, the managers have attended the great fair at Novogorod, and the hair comes to them through the intervention of Russian brokers through Moscow and St. Petersburg. The packages come in stout linen cloth, made in the hand-loom of Siberia. The value of a single tail, at the establishment, is about forty cents. Sometimes the hair of the tail is cut off from the living horse, to furnish the insignificant sum which the owner receives for the hair. The hair is reproduced in two years.

The conception of weaving hair-cloth by power would never have occurred except in a manufacturing community, where the examples of difficulties surmounted abound. The obvious difficulty in this case was that the weft, unlike other textile materials, does not form a continuous thread. There can be but one separate hair for a pick, and the width of the cloth is measured by the length of the hair. In Europe, and especially Belgium and Germany, whence all the hair-cloth consumed here came, until the Rhode Island industry was established, the cloth is all woven in hand-loom. Two persons are required for each loom, one to pick up the single hairs one by one and put them in the warp, and the other to operate the loom. The great difficulty to surmount was first to pick out from a bunch a single hair automatically, and, secondly, to grasp it so that it could be carried through the threads of the warp, as in a shuttle.

The first conception of the devices for picking up the hair originated in 1857 with Mr. Isaac Lindsley, the inventor and patentee of all the most important features of the mechanism employed by the company. This gentleman is still in their employ. The

mechanism was not completely successful until 1865; and the company was subjected to enormous losses by unsuccessful trials. The present company worked fully five years after their incorporation before allowing any earnings for stockholders, the association which preceded the corporation having sunk all that they had invested. The first dividends of the present company, from earnings, was in 1868.

The work of picking up and applying the hair automatically is now accomplished by a little machine of two or three parts, which could be packed in a box two inches square. This machine, which is detachable for repairs, when attached to the loom, forms the pivot on which the whole manufacture turns. It is essential that this machine shall pick up but one hair at a time. To accomplish this the picker has a groove or slit, invisible to the naked eye, so that the whole of this manufacture turns upon a point which cannot be seen but with a microscope. The loom is so adjusted that the movement of the web is arrested until the picker lifts up its hair. The end of the hair is seized by a rod, the end of which operates like a thumb and finger, and is carried transversely between the warps.

Now this little apparatus is attached to 400 distinct looms in this establishment. One girl tends ten looms; and thus one girl by this machinery does the work which requires twenty operatives in the hand-loom of Belgium. The two Belgians, however, can work in a cellar, while this establishment required an outlay of half a million dollars; and the interest on the capital, it is asserted, is equal to the whole cost of the Belgian labor in weaving the same number of yards that are made in this mill. The labor which is performed abroad in thousands of separate garrets or cellars, concentrated here by the genius of invention, and by national protection, produces in a single establishment, and with only 150 workmen, 600,000 yards per annum; each loom weaving five yards per day; consuming 450,000 pounds of horse-hair, equivalent to the tails of *six hundred thousand horses*.

Although we have summarily described the main feature of this establishment, there are others not uninteresting. The hair requires careful cleaning from dirt and the very short hairs, for no hair can be used in the cloth which is less than fourteen inches long. The hair is cleaned by drawing the bunches through fixed combs, as in hackling flax, a work done by boys. A more difficult work is the separation of the hairs into the required lengths. All the

hair is sorted into distinct lengths, from fourteen to thirty-five inches. This is at present done by hand labor; but a machine has been devised, and nearly completed, for performing this work automatically. The sorts of different lengths determine the width of the cloth. As there are fewer long than medium hairs, the wider cloth has a proportionately higher price. In using the cloth the upholsterer cuts from several pieces to adapt the cloth to the furniture to be covered. The greater part of the hair is dyed black before it is woven; although in some of the cloth the hair is left undyed, the cloth showing pleasing stripes of different neutral tints according to the varying shades of the hair. The surface of the cloth is freed from broken or projecting hairs by an ingenious and peculiar shearing apparatus moved by power.

The regularity of the operation of the machines, and the systematic perfecting of details possible in a large establishment, have enabled this establishment to turn out goods greatly superior to those made abroad in the hand machines. All the goods sold are warranted to *suit*, and reclamations for imperfect goods are almost unknown. Commercial fidelity has proved to be one of the most important elements of the success of this establishment. The present strength of the company in the market is due to the quality and reliability of their goods. They are accepted as the *standard*, and importers must sell below the company's product, or hold their goods. The present quotations of foreign hair-cloths show prices ten to twenty per cent below those of Rhode Island production. Here is a strong case of reduction of prices of foreign goods by an American protected manufacture, and another proof of the fallacy of the assertion, that a protective duty is a tax upon the consumer.

The objection occurred to us, that this fabric is going out of use. Not many years ago it was the material invariably used for covering the best parlor chairs and sofas, it having taken the place of leather and stuff fabrics. The Utrecht velvets and brocades have now largely taken the place of the hair-cloth in more expensive furniture. But we are informed that the use of this material still prevails for certain classes of furniture of a less luxurious type, and its durability will probably restore it to many uses where it is now abandoned. At any rate, the manufacturers find in ordinary times no diminution of the demand.

An instructive feature in the history of this industry is the illustration it affords of the advantages of specific duties. Our tariff legislation contemplated that this industry would be sufficiently

protected by an *ad valorem* duty of thirty per cent, which was originally given to it. Although goods more than five per cent in cost below the standard value were practically useless, as there is no use whatever for lower grades, it was found by the manufacturers that foreign goods were invoiced at from a half to three-quarters of the standard value; of course fraudulently, and the protective duty contemplated was thus evaded. Upon a representation of these facts Congress, in 1870, gave to this manufacture the benefit of specific duties as to other textile fabrics. Under these duties the protection realized does not exceed thirty-five per cent, an apparent increase of but five per cent, while, practically, the protection realized, by preventing the evasion of the duty, is double that under the *ad valorem* system.

This industry illustrates the diversification of employment produced by a national system of promoting manufactures. It was the direct outgrowth of the cotton and woollen manufacture established by that system. Its machinery was readily and perfectly supplied by its contiguity to the machine shops, supplying the cotton and woollen factories. Its operatives were already trained in these mills. The application of the invention upon which it is based was made upon the faith of the security given by our patent laws, which free-trade is logically compelled to denounce. Nothing less than the security given to patent property would have authorized the investment of half a million dollars in the application of the invention. The invention, which we have described, impressed more fully the conviction which we have long had, that a longer period than that given ordinarily by the patent laws is justly due for the enjoyment of the exclusive right of property in really valuable inventions. Three-quarters of the life of this patent has been consumed in unproductive experiments. This is too frequently the case, both here and in Europe. Mr. Alcan, the historian of the wool manufacture of France, while attributing the progress of late years to the patent legislation which "has been the logical complement of the liberty given to each one to produce and enjoy the fruit of his own labor," says: "Such as it is, in spite of its defects, it has hastened the progress of the last fifty years, . . . and we dare affirm that the industrial development would have been greater still if the larger part of inventions, even the most useful and the most practical, had not required twenty years at least to effect their adoption."

INTRODUCTION OF MACHINE-MADE CARD CLOTHING.

IN 1786 Samuel Slater, of Providence, R. I., the pioneer of the cotton manufacturing industry of this country, returned from England with draughts for the construction of cotton machinery, the exportation of which was strictly forbidden by the British government to any of its colonies. So guarded were they of that interest, that he was obliged to conceal his draughts in the soles of his boots. Immediately on his arrival he commenced the development of his plans, but found great difficulty in procuring card clothing for his machines, which were useless without it.

Learning that Pliny Earle, of Leicester, Mass., was engaged in the manufacture of hand cards, he visited him, and explained what he wished to accomplish. Mr. Earle assured him that it could be done, though the process would be long and tedious. He procured some calfskins, from which he prepared some sheets four inches wide by eighteen inches long. With two needles he pricked the holes for the teeth, and put the teeth in with his fingers. Having finished the difficult task, he delivered the first machine card clothing made in America, to the mill in Pawtucket, and returned home with his hard-earned money.

Mr. Slater proceeded to adjust the cards for work. One night, after days of anxious trial, he went late to his supper, which he ate in silence. Rising from the table, he took his seat before the smouldering embers on the hearth, and leaning his head upon one of the tall andirons, remained there for a long time without speaking. When he arose, his aunt noticed tears in his eyes, and said to him, "What is the matter, Samuel?" He replied, "My card will not work; I do not cry for that, but for my reputation. I represented to my friends that I was sure of success, and now a failure stares me in the face; what will they think of me?"

Next morning he arose early, saddled his horse, and rode to Leicester, forty miles, and explained his trouble. Mr. Earle assured him that he could remedy it, and returned to Pawtucket with him. On examination, he found that in grinding the card, the teeth had been bent down, causing them to work rough, and to be totally unfit for service in that condition. He immediately began to adjust them by scraping them back into place, and then grinding them very gently; after which cotton was put through with com-

plete success. Cards are spoiled in this same way every day by the carelessness of grinders.

Mr. Slater's first cards were run for eighteen years. From this small venture sprung the cotton mills of America, and Mr. Earle with his brothers devoted their lives to the development of the card business. After the first trial, he made a machine to prick holes in the leather, and with another machine he made the teeth. These he sent about the towns to be put in by the fingers of women and children. But, in due time, Yankee genius combined the two machines, thereby securing to New England the honor of producing the first card-setting machine the world ever saw. For twenty years card teeth were put in by the fingers; and to Elizur Smith belongs the honor of creating a machine more dexterous than the fingers. It is a noteworthy fact that this machine has not been essentially improved since it was perfected thirty years ago, by William B. Earle, son of Pliny Earle, although many attempts in that direction have been made, with a large outlay of money. We think this can be said of no other machine. A few facts showing the growth of the business may be interesting.

During the first year of Pliny Earle's connection with the card business, he did not use more than a dozen calfskins; afterwards he made use of cowhides tanned expressly for the purpose. The increase of consumption of leather for cards was very slow at first, and even in 1843 it had reached only two thousand sides per year. Since then it has become larger year by year, until now Messrs. T. K. Earle & Co., the successors of Pliny Earle & Brothers, use yearly thirty thousand sides. Pliny Earle used sheepskin in making hand cards, which in that time were to be met with in every well-furnished New England homestead; and were in demand to supply the old-fashioned spinning-wheel, now an institution of the past, and to be found only stowed away in the cobwebbed attic of some ancient dwellings. With it have gone some of our simpler habits; our boys no longer make love in their homespun to the music of the spinning-wheel, where the girls proved their sterling worth and learned to weave the thread of life.

We note the following particulars of the card manufactory of T. K. Earle & Co., of Worcester, Mass., which we take from the "Shoe and Leather Record," of 1872.

"We note the following particulars of the manufactory of Mr. Earle at Worcester, to show the difference in cost of material, labor, and product, especially during the last three decades. In 1843 his leather cost, on an

average, \$2.50 per side; his consumption at that time was 2,000 sides of leather per annum, while he paid only \$1.50 per day for the best workmen, and sold his cards at 90 cts. per square foot. Now, his leather costs, on an average, \$5.50 per side; his consumption amounts to 30,000 sides of leather per annum; he pays the best workmen \$4 per day, and sells his cards at \$1.25 per square foot. Thus we see card leather is 120 per cent higher than it was in 1843. Mr. Earle's consumption of it has increased 1,400 per cent, and he pays 166 $\frac{2}{3}$ per cent more for wages, while he obtains only about 89 per cent more for his product. In these figures we have a striking example of the power of machinery in simultaneously multiplying the products and increasing the wages of labor without unduly enhancing the cost of the manufactured article."

THE PROTECTION OF NATIVE INDUSTRIES.

[From the *New York Times*.]

HAVING been educated by the standard you raised and have maintained, I feel bound to honor American industry. Such diabolical misrepresentations and malicious slanders have never appeared in print before as were contained in an article in the "Evening Post" of May 5, 1875, as follows: "That a dulness in the woollen market has extended right along for eight years, due to permanent causes. That the proximate cause of the totally unsatisfactory condition of the woollen manufacture in this country is that the intelligent people of the United States are for the most part too prudent to buy American woollens. That they buy English, Scotch, German, and French, — not American goods. That the alleged dulness in the woollen market is the reluctance of our people to buy such flimsy, shabby, shoddy goods as the most of our mills are throwing upon the market. That Protection has to answer for this fraudulent practice."

Now, what are the facts? This country in the last eight years has increased her manufacture of woollens alone from \$60,000,000 to \$154,000,000, being nearly three times the amount, while our population increased but twenty-two and one quarter per cent. What has become of those goods if our people are all clothed in English, Scotch, German, and French goods? Now, is there any doubt in the minds of experienced men that the manufacture of cotton, silk, and worsted goods, iron, steel, cutlery, pins, needles, watches, and numerous other industries have increased in the same ratio? With an increase in the price of all labor, if paid in gold, of one hundred per cent, the wonderful work that has been done in the United States since the passage of the tariff of 1867 has astonished the nations of the earth, and excited the envy of many as to the style, quality, and durability of our woollens. This was substantially settled by a disinterested and able tribunal. That our goods — made of wool grown in the United States, called by our

people domestic wools, and which are acknowledged by all experienced men to be superior in nearly every respect — took the medal. Now, as to shoddy goods, Dewsbury will probably beat the world. Mr. Behrens, President of the Bradford Board of Trade in England, states that England consumed in the year 1864, 79,000,000 pounds of shoddy in making woollen goods. They buy our rags in New York by the cargo, ship them home, and laugh at our stupidity for not making goods in the same way. Then to be slandered by a man in the position of W. C. Bryant! His statement should be exposed to public indignation. Plead ignorance after having an opportunity of being enlightened by such men as Alexander Hamilton, Henry Clay, Daniel Webster, Horace Greeley, Daniel Raymond, Willard Phelps, John Roe, Henry C. Carey, William Bushnell, besides 7,000,000 of hard-working farmers in the Middle and Western States, with the votes in their hands to protect the price of their wools from wools raised in other countries, — where men keep 70,000 sheep, and no winter in their whole year! Our farmers begin well to understand this game. There is very little politics about this tariff question. The question now is, Will we help our own people, that have been used to good living, or go to Germany and help those that have been used to a plain living. In another article Bryant alludes to the Cobden Club and John Bright. Why does he not quote Lord Brougham, who stated in the House of Lords, "England could well afford to lose on her exports of goods to the United States in order to produce a glut in our markets, and strangle our infant manufactures in the cradle." The heart of this nation says nay. We will rear them to manhood and protect them equally with all other industries, as well as the labor of our land, as long as it shall be necessary, and not have it said that we have a town in our country where "not a woman in it has a dress that comes below the knees." The tariff is the great and only cause why we have gone ahead as we have, and all sound thinkers are well aware of that fact.

How could we have paid \$663,000,000 of our national debt, besides the interest and taxes, if there had been any truth, or shadow of truth, in Mr. Bryant's statement that all our people are clothed with foreign goods? How did France pay her large indemnity to Germany? In consequence of her protection laws. How did Russia start 500 factories? By her protection laws. What will enable the United States to pay her national debt? By protecting all her labor and her industries.

SAMUEL HARRIS.

CATSKILL, Monday, Aug. 16, 1875.

INTERNATIONAL EXPOSITION, 1876.

PROPOSED exhibitors at the International Exposition for 1876 are requested to notice the following Circular received from the Commission during the month of September:—

RULES AND INFORMATION FOR EXHIBITORS.

1st. — The space granted to an exhibitor within the building is available floor space, exclusive of the intermediate passages between the exhibits. It may be utilized in various ways, as follows:—

By placing the products exhibited directly upon the floor.

By constructing a low platform upon which they may be placed.

By erecting counters on which they may be arranged.

By erecting ornamental columns, pyramids, cones, and partitions to obtain wall space.

By erecting show-cases in which the exhibits may be tastefully displayed.

2d. — There will be no charge for space; but all platforms, counters, ornamental partitions, show-cases, and appurtenances must be erected at the expense of the exhibitor. No particular form or design is prescribed for the cases, counters, &c.; but they must not exceed the following heights, without special permission from the Chief of Bureau:—

Show-cases and Partitions. — Fifteen feet above the floor.

Counters. — Two feet ten inches above the floor, on the side next to the passage-way.

Platforms. — One foot above the floor.

3d. — In order to insure the advantageous and satisfactory location of products exhibited, applicants for space, desiring to erect show-cases, counters, or partitions, must furnish to this Bureau a scale drawing or tracing, showing clearly the elevation and ground-plan of the same, and especially indicating the sides of the cases intended to be open for inspection.

4th. — Exhibitors will have the privilege of placing railings of approved design around the space allotted to them. All such railings must not exceed the height of two feet six inches above the floor level, and may be attached to the case by projecting brackets, or be supported by posts from the floor. In every instance, the floor space granted *includes* the area embraced by the railing. The line of the railing will be placed upon the line of the passage-way, and no railing will be allowed to project beyond the case or counter into the passage-way.

5th. — Exhibitors desiring to display products pendent from the roof trusses, must in every case obtain special permission to that effect from the Chief of Bureau.

No exhibitor will be permitted to display products in such a manner as

to obstruct the light or vistas through the avenues and aisles, or occasion inconvenience, injury, or disadvantageously affect the display of other exhibitors.

6th. — Signs will not be allowed to project beyond the floor area of the space allotted, nor will signs made of canvas or paper be permitted. The size of all signs will be subject to approval.

7th. — the nave, avenues, aisles, and public passage-ways remain under the control of the United States Centennial Commission; and no trophies, decorations, portals, fountains, or other special exhibits will be permitted in them, except by special permission of the Director-General.

8th. — Each column within the building will be lettered and numbered: the letters designating the lines of columns lengthwise, from east to west; and the numbers, the lines crosswise, from north to south. Each exhibitor will have his location defined with reference to the nearest column, and the official directory of the building will give the positions according to this system.

9th. — Exhibitors having space granted in close proximity to the columns or outer wall of the building, will be furnished from this Bureau with drawings showing the form of the columns, the water-spouts, and the available wall space.

10th. — Cards supplied by the Centennial Commission may be affixed to goods, stating the exhibitor's name, address, and place of manufacture, class of objects, catalogue number, and price.

Exhibitors' business cards, circulars, and samples may be placed within their space for distribution; but visitors shall not be solicited to receive them.

11th. — When the allotment of space is definitely made, each exhibitor will be notified and furnished with a permit for space.

12th. — *All exhibits in the United States section must be entered at the office of the Chief of the Bureau of Installation; and, before unpacking or arranging the articles, the entry must be endorsed on the permit for space.*

13th. — All products arriving at the doors of the building, by rail, wagon, or otherwise, will be received by the Bureau of Transportation, and delivered on the space granted. Each exhibitor will then be expected to unpack and arrange his goods without delay. Provision has been made for the removal and safe storage of empty boxes and cases immediately after unpacking.

14th. — All exhibits must be in position, and finally arranged, not later than May 1st, 1876.

The Chief of the Bureau of Installation has charge of the allotment of space to exhibitors in the United States section.

The right to alter or amend these rules is reserved.

A. T. GOSHOEN, *Director-General.*

HENRY PETTIT, *Chief of Bureau of Installation.*

PHILADELPHIA, Aug. 20, 1875.

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ASBESTOS ROOFING, adapted for steep or flat roofs in all climates; furnished in rolls containing 200 square feet, packed in skeleton cases.

ASBESTOS ROOF COATING, for the ASBESTOS ROOFING, and for restoring and preserving Roofs. Old Tin, Shingle, Felt, and other Roofs can be made water-tight, and rendered serviceable for many years with this COATING and the ASBESTOS CEMENT. In kegs and barrels.

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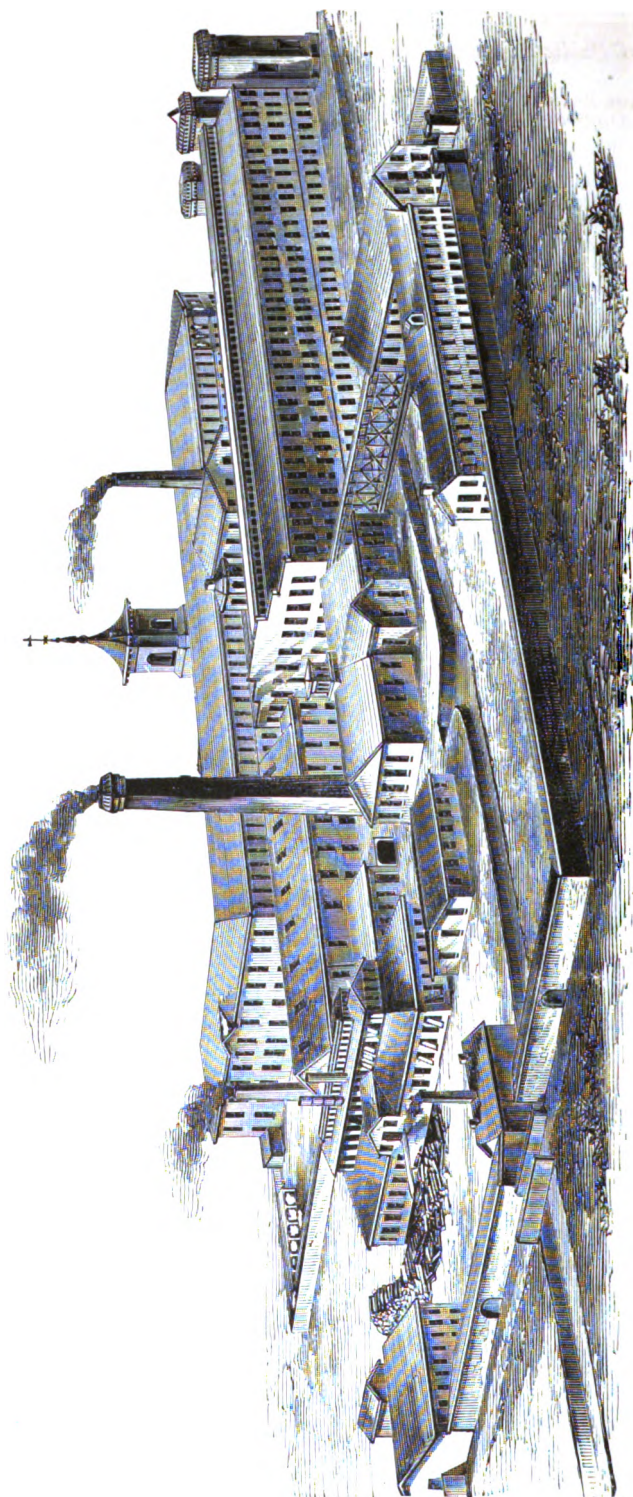
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J. LASKELL, Treasurer.

G. E. TAFT, Superintendent.

List of Publications to be obtained at the Office of the Association.

- I.
OBJECTS AND PLAN OF THE NATIONAL ASSOCIATION OF WOOL MANUFACTURERS: its Organization, Articles of Association, and By-laws. 20 pp.
- II.
THE FLEECE AND THE LOOM: An Address before the National Association of Wool Manufacturers at the first Annual Meeting in Philadelphia, Sept. 6, 1866. By John L. Hayes, Secretary. With Secretary's Report and Tables. 80 pages. Bound in cloth, \$1.00; in paper, 60 cts.
- III.
REPORT OF THE PROCEEDINGS OF THE CONVENTION OF DELEGATES from the National Association of Wool Manufacturers, and from the several Organizations of the Wool-growers of the United States, at Syracuse, N. Y., Dec. 18, 1866. 99 pp.
- IV.
JOINT REPORT OF THE EXECUTIVE COMMITTEE of the National Association of Wool Manufacturers, and of the Executive Committee of the National Wool-Growers' Association, addressed to the United States Revenue Commission, Feb. 9, 1868. 23 pp.
- V.
STATEMENT OF FACTS RELATIVE TO CANADA WOOLS AND THE MANUFACTURES OF WORSTED. 21 pp.
- VI.
THE CARPET MANUFACTURE: A Statement of Facts addressed to the United States Revenue Commission. 9 pp.
- VII.
STATEMENT OF THE EXECUTIVE COMMITTEE of the National Association of Wool Manufacturers, relative to Proposed Duties on Wool and Woollens, with explanatory Key, addressed to the United States Revenue Commission, May, 1866. 42 pp.
- VIII.
LETTER, EXHIBITING THE CONDITION AND NECESSITIES OF THE KNIT-GOODS MANUFACTURE, addressed to Hon. Justin S. Morrill, Chairman of Committee of Ways and Means, May, 1866. 19 pp.
- IX.
"PROTECTION A BOON TO CONSUMERS." An Address by John L. Hayes. 58 pp. Bound in cloth, \$1.00; paper, 50 cts.
- X.
THE ANGORA GOAT: Its Origin, Culture, and Products. By John L. Hayes. 88 pp. Bound in cloth, \$1.00; in paper, 50 cts.
- XI.
REPORT UPON WOOL AND MANUFACTURES OF WOOL. Paris Universal Exposition, 1867. By E. R. Mudge, U.S. Commissioner, assisted by John L. Hayes. 148 pp. Bound in cloth, \$1.50; in paper, 75 cts.
- XII.
BULLETIN OF THE NATIONAL ASSOCIATION OF WOOL MANUFACTURERS. January, 1869. Vol. I., Nos. 1, 2, and 4. Vol. II., Nos. 1, 2, 3, 4, 6, and 7. Vol. III., Nos. 1, 2, 3, and 4. Vol. IV., Nos. 1, 2, 3, and 4. Vol. V., Nos. 1 and 2.
- XIII.
WOOL INDUSTRY OF THE UNITED STATES: An Address delivered at the Exhibition of the American Institute, in the City of New York, Oct. 5, 1869, by Erasmus B. Bigelow, President of the National Association of Wool Manufacturers. 23 pp.
- XIV.
AN EXPOSITION OF THE PRINCIPLES forming a Basis of the Present Tariff on Manufactures of Wool, and of the Sections relating to Woollens recommended by the Committee of Ways and Means, February, 1870. Reprinted from the "Bulletin of the National Association of Wool Manufacturers," by authority of its Executive Committee. 18 pp.
- XV.
THE PROTECTIVE QUESTION ABROAD, and Remarks at the Indianapolis Exposition. 66 pp. Bound in cloth, \$1.00; in paper, 50 cents.
- XVI.
THE SOLIDARITY OF THE INDUSTRIES, as illustrated by the Relations of the Woollen Manufacture: An Address delivered at the Fair of the American Institute, New York, October 18, 1870. 28 pp. Bound in cloth, \$1.00; in paper, 25 cents.
- XVII.
THE PROTECTIVE QUESTION AT HOME; being the Substance of a report of the Committee on Manufactures submitted to the Fortieth Congress by Hon. D. J. Morrell, of Pennsylvania, with Supplementary Notes. 56 pp. Bound in cloth, \$1.00; in paper, 50 cents.
- XVIII.
REVIEW OF ALCAN ON THE MANUFACTURE OF WOOL; being a Supplement to "The Fleece and the Loom." 40 pp. In paper, 50 cents.
- XIX.
INTRODUCTION OF THE WOOLLEN MANUFACTURE INTO THE UNITED STATES. By Royal C. Taft. In paper. 12 pp.
- XX.
THE WOOLS OF THE UNITED STATES. By John L. Hayes. 47 pp. In paper.
- XXI.
SPEECHES, ADDRESSES, AND LETTERS ON INDUSTRIAL AND FINANCIAL QUESTIONS. By William D. Kelley, M. C. 514 pp. In cloth.
- XXII.
NOTES UPON INDIGO. By John L. Hayes. 79 pp. Bound in cloth, \$1.00; in paper, 50 cents.

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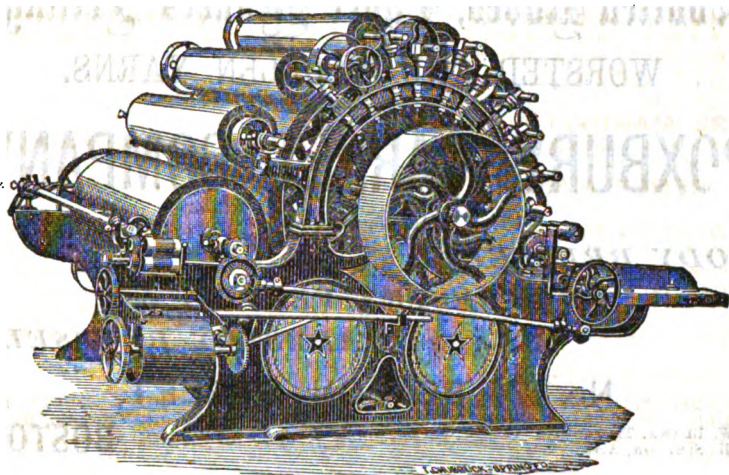
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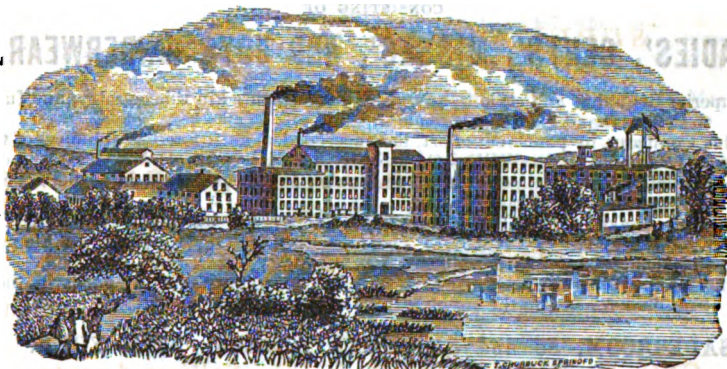
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H. R. SAFFORD, Superintendent Royalston Woollen Mills.

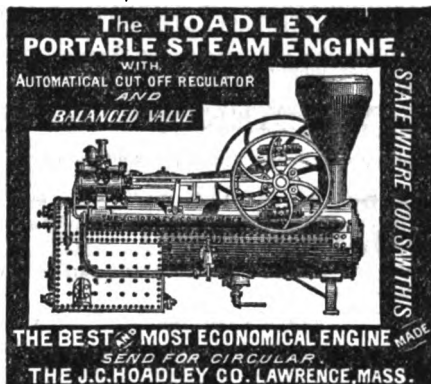
I fully indorse all my Superintendent has said in regard to the Patent Indigo Blue Dye.

GEO. WHITNEY.

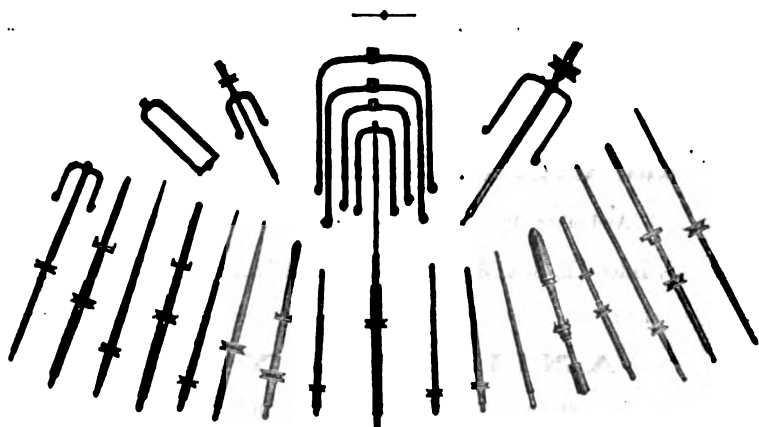
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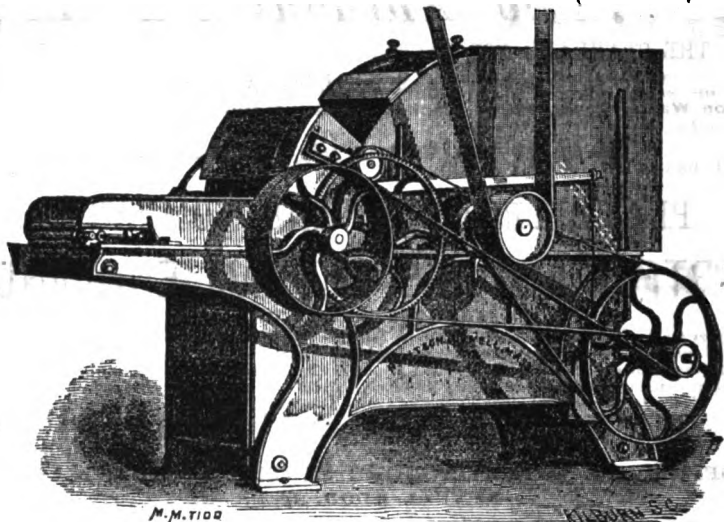
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We are lighting upwards of one hundred first-class Manufactories at an average cost less than one dollar a burner a year, when running full time.

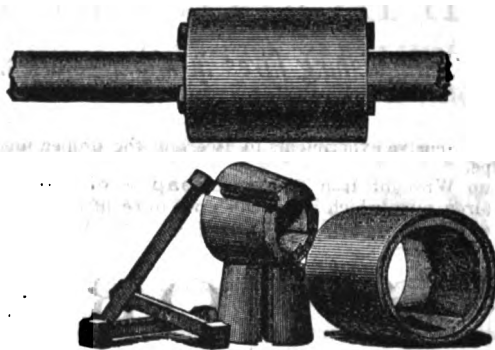
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For 25 years we have been engaged in perfecting a system for the Transmission of Power, and we can now offer a well constructed, easy-running line. We make every thing requisite in the construction of **SHAFTING**. We make tender for the whole work, erected ready for the belts, and for a gross sum, and invite correspondence.

A book descriptive of **SHAFTING** and what is required sent free to parties sending address.

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EXTRA THREE PLYS,

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NO. 120 WILLIAM STREET, NEW YORK,

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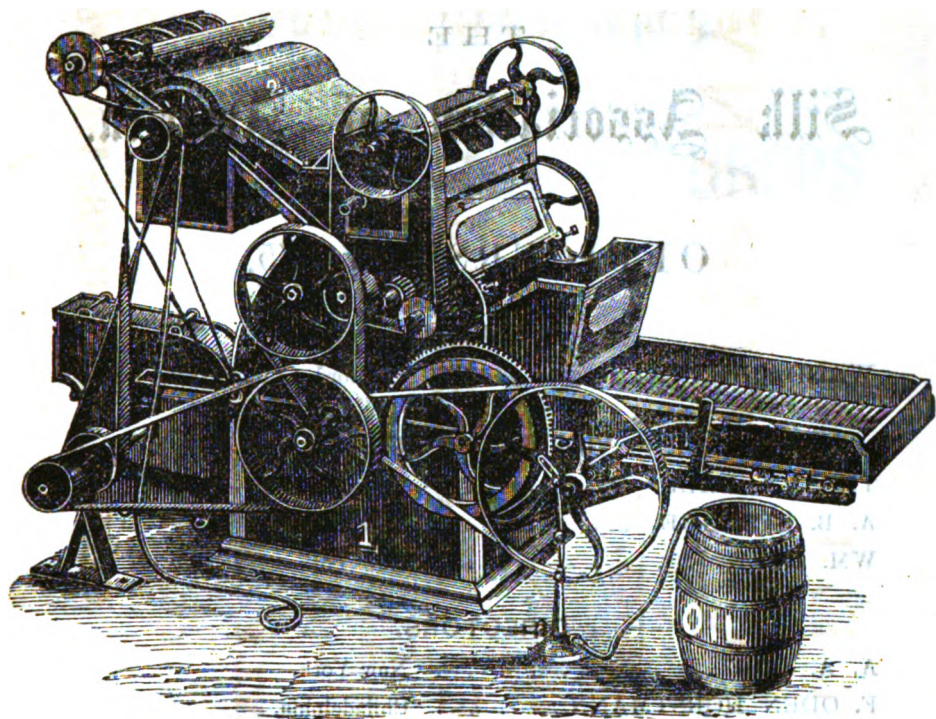
The works of this Company are conducted under the direct personal supervision of the inventor of the "Corliss Engine," and are

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Where the most perfect type of this Engine can be obtained.

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PARKHURST'S PATENT DOUBLE CYLINDER BURRING PICKERS,

For Picking, Burring, and Dusting all grades and qualities of Wool. Recent improvements, including a beater attached to the spout, for the purpose of more thoroughly mixing and cleaning the wool; attached to this is an improved Oiler, for the purpose of oiling the wool. Wool running once through the Picker is dusted, burred, and picked, ready for the cards, making a saving of labor and power; the wool is prepared better, and is more evenly oiled and picked, than by any other process in use. (See No. 2.)

No. 3.

PATENT STEEL-RING DOUBLE BURRING MACHINES,

With patent Steel-ring Feed Rollers, applied to Carding Machines.

No. 4.

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Applied to First Breakers of Carding Machines.

FINE STEEL-RING BURRING MACHINES,

Applied to Second Breakers and Finishers of Carding Machines.

No. 5.

PATENT STEEL-RING FEED ROLLERS,

Applied to Single Burring Machines, Second Breakers and Finishers of Carding Machines. Patents granted June 17, 1866, March 13, 1865, July 24, 1864, January 11, 1870.

STEEL-RING WASTE CARD.

(Double and Single) for all kinds of hard and soft, twisted Yarns worked up. Superior to all other Machines now in use, and for about half the price of the imported ones.

Re-clothing, Grinding, and Filing parts of Machines, Castings, &c.,

Promptly attended to and furnished on short notice.

All Machines guaranteed to give perfect satisfaction. Thirty days' trial allowed.

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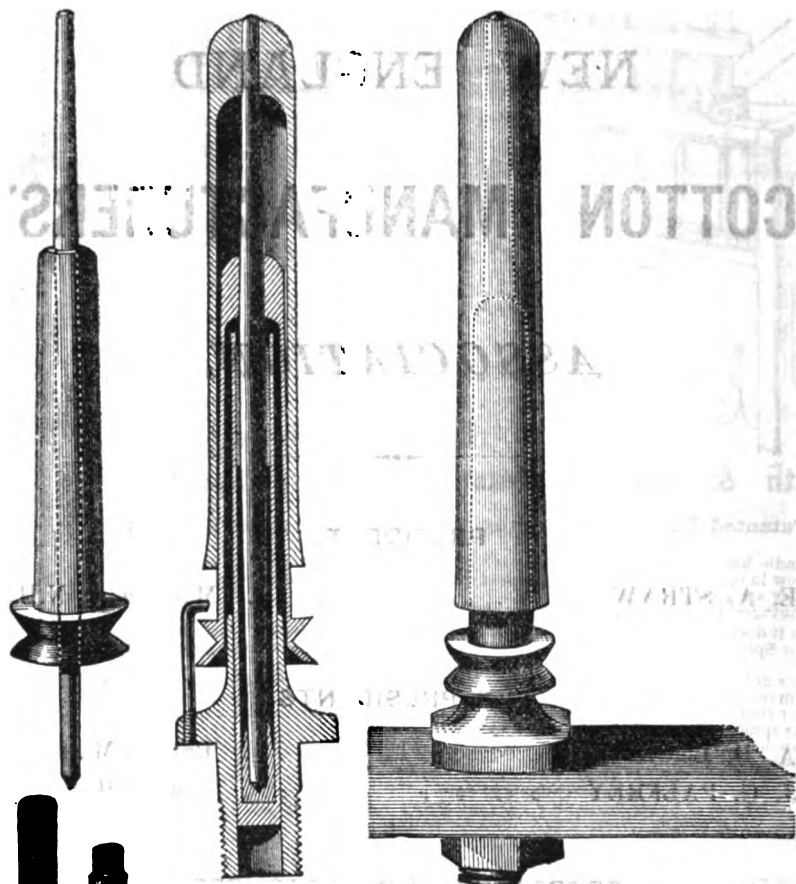
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Rabbeth & Atwood's Patent Self-Oiling Spindles,

FOR LIGHT WORK.

FALES, JENKS, AND SONS,

MANUFACTURERS OF

COTTON MACHINERY;

Also, Shafting and Hangers, with Self-Lubricating Boxes, Rotary
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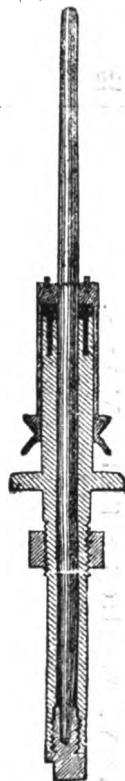
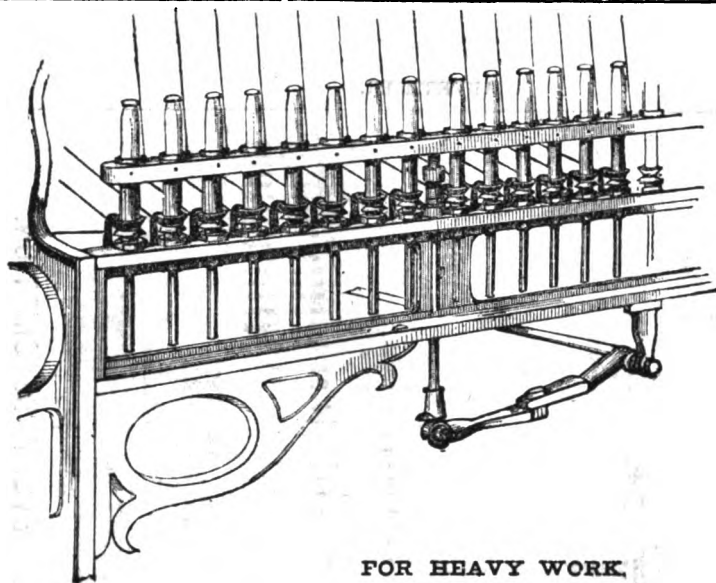
Hydrants and Discharge Pipes,

G. A. HOUSTON'S TURBINE WATER WHEEL.

Cast Iron Water and Steam Pipe constantly on hand. Foundry Work done to order.

PAWTUCKET, R.I.

[SEE OPPOSITE PAGE.]



FOR HEAVY WORK.

Rabbeth & Atwood's Patent Self-Oiling Spindle.

Patented Dec. 18, 1860; Aug. 25, 1866; April 2, 1867.

This Spindle has now been in operation over six years, and has proved to be durable. There are now in operation over 250,000, large and small, in lots of from 25,000 down to single frames. They are giving general satisfaction.

The advantages claimed for this Spindle over all others are, —

1st. That it does not require oiling oftener than from twice to eight times a year. As it is arranged, the Spindle actually runs in oil, while that oil is perfectly protected from light, dust, and air.

2d. It does not throw off oil, thereby saving much oil and labor in keeping the frames and floors clean.

3d. It is more durable, being thoroughly oiled and the bearings perfectly protected from dust and grit.

4th. If for ring-spinning, it simplifies the frames very much, and avoids the necessity of using adjustable rings, as this spindle is perfectly adjustable to the ring.

5th. A much simpler and cheaper Bobbin is required than can be used on any other of the various improved Spindles.

6th. There is no possibility of slack twist from bobbins slipping on spindle. This spindle holds the bobbin more securely than any other taper top spindle ever made.

A comparative test of power, had at the PACIFIC MILLS, Lawrence, Mass., Oct. 1, 1873, showed the following results:—

Maker of Frame.	Kind of Spindle.	Size of Ring.	No. of Yarn.	Rev. per min.		Av. of Power.		Spindles per H.P.
				Front Roll.	Spindle.	Whole Frame.	Per Spindle.	
Lowell Mach. Shop	Rabbeth	1½ in.	28	73	6059	1.186	3.90	141
J. O. Whitin's . . .	Sawyer	1½ in.	28	73	6059	1.877	4.74	116
" " . . .	Pearl	1½ in.	28	78	6059	1.488	5.10	107

The above tests were conducted by SAMUEL WEBBER, C. E., of Manchester, N.H. Great pains were taken to have the conditions as near alike as possible on all the frames tested. The result may be relied upon, as showing a fair and impartial comparison. Over the common spindle doing the same amount of work, this spindle is guaranteed to save from 33 to 50 per cent in power.

Numerous testimonials might be given, but we prefer to give a simple reference to parties who are using them in large numbers, and where they may be seen in operation.

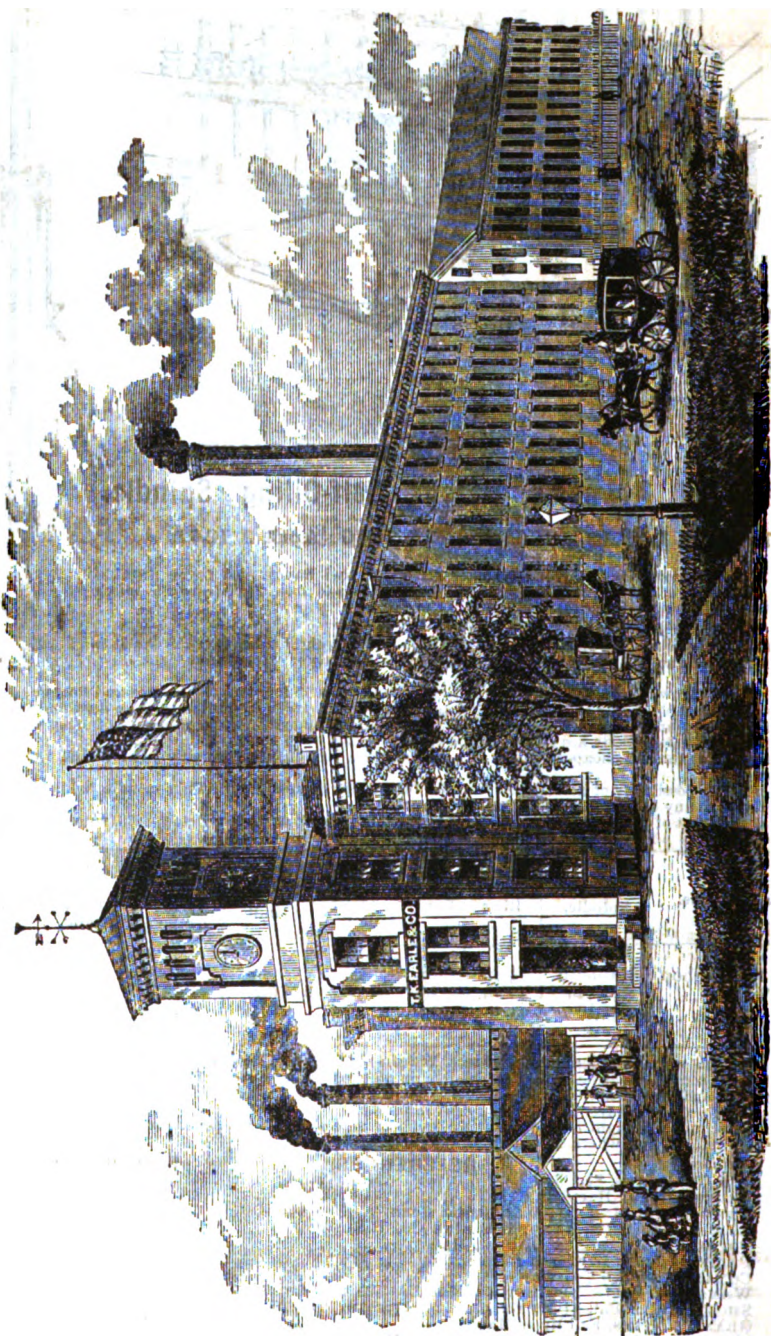
REFERENCES.

Messrs.	In operation.	Ordered.
J. & P. COATES, Scotland	54,500	15,000
CHENEY BROS., Hartford, Conn.	15,000	
ATWOOD MACHINE CO., Willimantic, Conn.	16,000	
A. & W. SPRAGUE MANUFACTURING CO., R.I.	21,000	
POTOMSKA MILLS, New Bedford, Mass.	21,000	
PACIFIC MILLS, Lawrence, Mass.	24,000	
CONANT THREAD CO., Pawtucket	25,000	25,000
WAMSUTTA MILLS, New Bedford, Mass.	37,000	25,000
SHOVE MILLS, Fall River, Mass.	15,380	2,500
GRANITE MILLS, Fall River, Mass.	15,380	2,500
NAUMKEAG STRAM COTTON CO., Salem, Mass.	10,000	
BERKELEY MILLS, Londale, R.I.	4,000	
UTICA STRAM COTTON CO., Utica, N.Y.	7,000	
WALCOTT & CAMPBELL, New York Mills, N.Y.	7,016	

Parties about to contract for new machinery, or make repairs on the old, will find it greatly to their advantage to use these spindles. For further information regarding the RABBETH SPINDLE, please address

FALES, JENKS, & SONS, Pawtucket, R.I.

T. K. EARLE AND COMPANY, WORCESTER, MASS.



MANUFACTURERS OF MACHINE CARD CLOTHING OF EVERY DESCRIPTION.

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PAWTUCKET HAIR CLOTH COMPANY'S HAIR SEATINGS.

QUALITY SUPERIOR TO ANY IMPORTED GOODS.

EVERY PIECE FULLY WARRANTED.

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Manufacturers and Sole Agents for the sale of

Dutcher Complex, Sawyer Spindles, Double Spinning Rings,

WADE BOBBIN HOLDERS,

Thompson Oil-Cans, Shuttle Guides, Slasher Regulators, Slasher Markers, Spooler
Guides, Patent Motions for Looms, Patent Steps, Bolsters, &c., &c.

HOPEDALE (Milford), MASS.

HOPEDALE MACHINE CO.,

Builders of

PATENT WARPERS, SPOOLERS,

SAWYER SPINDLE TWISTERS, SLASHER BEAMS,

Harper Creels, Copper Rolls, Expansion Reeds and Combs, Yarn Testers, Yarn Reels,
Card Stricklers, Centering Machines, Beamers, &c., &c.

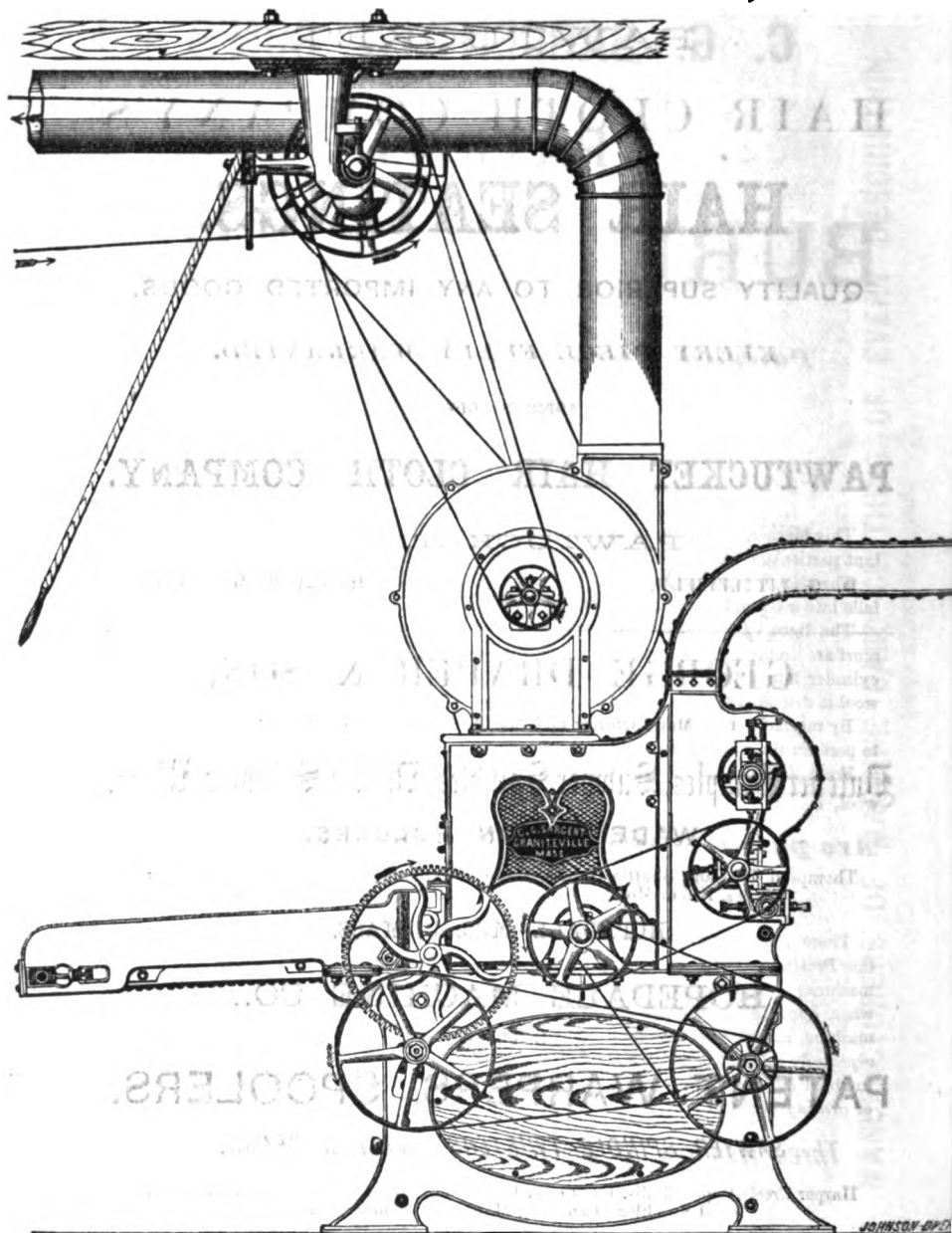
HOPEDALE (Milford), MASS.

GEO. DRAPER, Pres.

J. B. BANCROFT, Supt.

WM. F. DRAPER, Treas.

C. G. SARGENT AND SON, Graniteville, Mass.



RIGHT-HAND ELEVATION OF PATENT BURR PICKERS.

Patented December 8, 1861, and August 16, 1871.

CHAS. G. SARGENT.

FRED. G. SARGENT.

[See opposite page.]

C. G. SARCENT & SON'S

PATENT

BURR PICKERS.

*Patented December 3d, 1861, and August
16th, 1871.*

This Machine differs from any other heretofore offered to Manufacturers, in many important particulars, among which are the following, viz.:—

The *stock* in process of cleaning passes through four distinct sub-divisions, and each portion falls into a separate receptacle, unmixed with any other.

The light dust or other light matter is drawn *through* the Fan, while the heavy dirt and scurf are dropped into another place. Burrs, straws, sticks, &c., are thrown off from the Burr cylinder into a third distinct and separate receptacle; while the clean and thoroughly opened wool is delivered forward, as usual, in the open room prepared for it, ready for its next process.

By means of these sub-divisions, in a simple mechanical manner, the Machine is enabled to perform the work more perfectly, and without loss of fibre, as is usually the case.

From the mechanical arrangement of the parts, the *burrs*, when once separated from the wool,

Are passed at once out of the Machine into a separate department from the fibre.

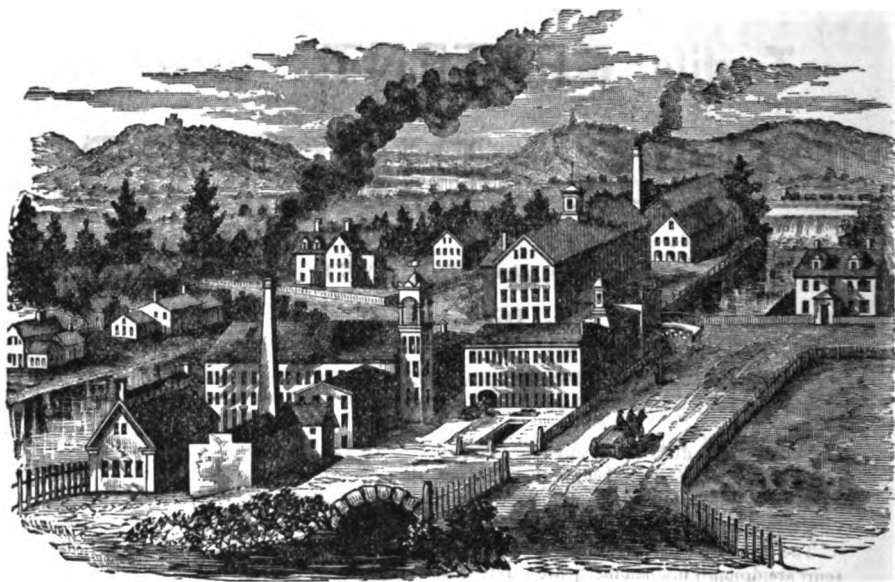
There is no fibre of any value lost *under* the machine, the foreign matter escaping under the *Picking* cylinder being free from fibre and only fit for the waste heap. In all other machines for Burring wool and for cleaning fibrous materials, the burrs and other substances, when knocked or beat out from the wools at the Burr cylinder, are thrown back *into* the machine, mixed with the approaching wool, attempt to pass the Burring cylinder, and are *repeatedly* knocked back again. This repeated process goes on indefinitely; the burr being tumbled forward and backward, until by its own weight it finds an outlet through the rack or *grating* beneath.

Three Hundred of these Machines are now in operation,

And are considered superior to all others.

ORDERS RESPECTFULLY SOLICITED.

WORKS OF THE NONOTUCK SILK COMPANY.



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MANUFACTURERS OF
Machine Twist & Sewing Silk
FLORENCE, MASS.

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147 State St.
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TRADE MARKS
Nonotuck.
Corticelli
Bartolini
and Clarks
Pure Dye.

ESTABLISHED 1838.

JUST ISSUED:

UNITED STATES Textile Manufacturers' Directory,

COMPRISING

Woollen, Cotton, Silk, Jute, Flax, Linen, and Paper Establishments,
and Iron and Steel Works in the United States,

For 1875.

This work contains a list of all the above-named manufacturers in this country, description of each Mill, with names of Treasurers, Resident Agents, and Superintendents; kind of Goods manufactured, with extent of Machinery, names of Selling Agents, &c. Arranged in separate departments, as follows:—

Wool and Woollen Department contains a list of **WOOL DEALERS** in the principal Wool Markets in the United States; **WOOLLEN MANUFACTURERS**, with capacity of Mill; **WOOL CARDERS**, **SHORDT MANUFACTURERS**, &c.

Cotton Department contains a list of **COTTON DEALERS** in the principal Cotton Markets; **COTTON MANUFACTURERS**, with capacity of Mill; **THREAD, LINE, AND TWINE MANUFACTURERS** and **PRINT WORKS**.

Silk Department, comprising list of **DEALERS IN RAW SILK**, **IMPORTERS**, &c.; **SILK MANUFACTURERS**, with description of Goods made, Agencies, &c. Prepared by the Secretary of the Silk Association of America, specially for this work.

Jute, Flax, and Linen Department. Devoted to these industries.

Dry Goods Department. List of Dry-Goods Commission Houses, Offices, and Agencies of Manufacturing Companies in the principal Cities.

Statistical Department: Devoted to Woollen, Cotton, Silk, Jute, Flax, and Linen Statistics of the United States.

Paper Department. List of Dealers in Paper Stock, Paper Warehouses, and Paper Manufacturers, with description of Mills, kind of Goods manufactured, &c., &c.

Iron and Steel Department, comprising list of Furnaces, Rolling Mills, Steel Works, Forges, and Bloomeries in every State, with valuable statistical matter. Prepared by the Secretary of the American Iron and Steel Association.

PUBLISHED BY THE

NATIONAL ASSOCIATION OF WOOL MANUFACTURERS,

11 PEMBERTON SQUARE, BOSTON, MASS.

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The oldest and largest Manufacturers in the United States of
VULCANIZED RUBBER FABRICS,
 In every form, adapted to Mechanical Purposes.

COMPRISING :

Machine Belting, with smooth metallic rubber surface.

Steam Packing, in every form and variety.

Leading and Suction Hose, of any size or strength.

Patent "Smooth Bore" Rubber Suction Hose.

"Test" Hose. — This extra quality of Hose is made expressly for Steam

Fire Engine use, and will stand a pressure of 400 lbs. per square inch.

Antiseptic Linen Hose, a cheap and durable Hose for mill and factory purposes.

Antiseptic Rubber-lined Linen Hose, the lightest Hose manufactured for

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Car Springs of a superior quality, and of all the various sizes used.

Solid Emery Vulcanite Wheels for grinding and polishing metals, — the

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Belt Hooks, Spinning Rings, Wire Goods, Cotton Banding,

Twine, &c. Leather Belting and Lace Leather,

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Importers of and dealers in **TENTER HOOKS, CLOTH HOOKS, TAPES**, for Woollen Mills, and Manufacturers' Supplies of every description.

Special Discounts to the Trade.

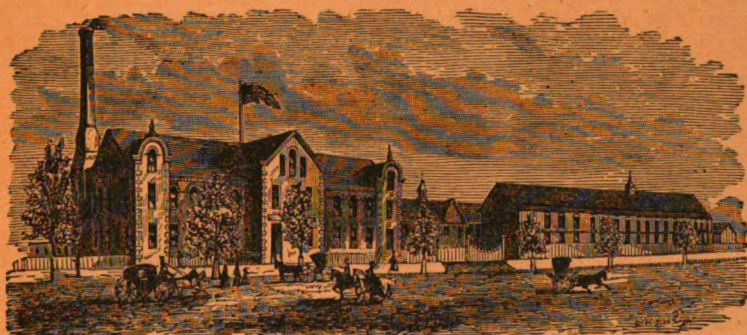
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CROMPTON LOOM WORKS,
WORCESTER, MASS.,



MANUFACTURER OF THE ONLY

Genuine Crompton Loom,

With Recent and Important Improvements, rendering it better adapted than ever for fine yarn, high speed, and extent of figure.

The variety of Looms made at these Works embraces the Broad Crompton for 6-4, and the Narrow Loom for 3-4 goods, with a twenty-four harness capacity, operating three or four shuttle-box compartments at each side of the lathe; specially adapted to all descriptions of cotton and woollen goods, including Fancy Cassimeres, Balmorals, Shawls, &c. Cam Looms, both broad and narrow, of any desired width, and with a variety of harness movement, arranged with one or a plurality of shuttles for Flannels, Dometts, Broadcloths, &c.

 MANUFACTURERS ARE CAUTIONED against purchasing Looms of other makers, INFRINGING on the many Patents I hold for Improvements in Fancy Looms, and are advised to take *written guarantees*, so that in case of suit, and recovery of damages, the loss may be sustained by the maker.

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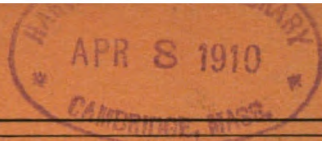
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OFFICE, 11 PEMBERTON SQUARE, BOSTON.



Elon 126.3
(Box on 2)

VOL. V.]

The Association
BULLETIN

[No. 7.

OF THE

National Association

OF

WOOL MANUFACTURERS.

FOUNDED NOV. 30, 1864.

1875.



EDITED BY JOHN L. HAYES.

BOSTON:
OFFICE, 11 PEMBERTON SQUARE.

1875.

TERMS, \$4.00 PER ANNUM.

Boston: Press of John Wilson and Son.

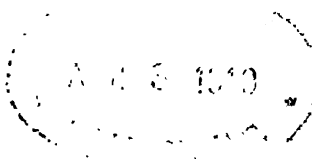
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BULLETIN

OF THE

National Association of Wool Manufacturers.

VOL. V.] BOSTON, OCTOBER—DECEMBER, 1875. [No. VII.

PROCEEDINGS OF THE ASSOCIATION.

THE ELEVENTH ANNUAL MEETING.

IN pursuance of previous notice, a meeting of the government of the NATIONAL ASSOCIATION OF WOOL MANUFACTURERS was held at the St. Nicholas Hotel, in the city of New York, on the 6th of October, 1875; in the absence of the President, Mr. GEORGE ROBERTS, one of the Vice-Presidents, being in the chair.

The reading of the records of the last meeting was dispensed with, as they had been published in the "Bulletin."

The several standing committees were called upon for reports. The committee on statistics reported by their chairman, Mr. GEORGE W. BOND, that they were preparing a series of statistics on the prices of labor, raw materials, and goods at the present time, as compared with the prices before the war, which would be published in a future "Bulletin."

The next business in order being the election of new members, on the recommendation of Mr. THEODORE POMEROY, Mr. FRANK KERNACHAN, of the Bellair works, Pittsfield Mass., was unanimously elected a member.

Upon motion of Mr. SAMUEL HARRIS, a committee of three members, consisting of Messrs HARRIS, BURLEIGH, and MAX-

WELL, was appointed to nominate a list of officers to be recommended for election at the Annual Meeting. Upon hearing the report of this committee, the meeting adjourned.

Immediately upon adjournment, the period having arrived for the Annual Meeting, it was called to order by the presiding officer, Mr. GEORGE ROBERTS.

The Secretary, in the absence of the Treasurer, read the Treasurer's report upon the financial condition of the Association. He also read a statement of the receipts and expenditures of the Association for the eleven years since its organization; showing the gratifying fact that, notwithstanding the depression of business, the receipts from assessments had not fallen off during the last year, that the expenses incurred for the last year had been less than in any former year, and that the amount of indebtedness was less than in many former years.

The Secretary then read his annual report, which was as follows:—

SECRETARY'S REPORT.

I comply with the by-laws of the Association in making an annual report; although such a report is in fact anticipated by our "Bulletin," which was not contemplated when the Association was formed. When I summarize the doings of the Association, I have only to consider what is already familiar to you through the pages of our publication.

It may not be known that a distinct plan and an objective point have been followed and kept in view in the leading articles of the "Bulletin" during the present year.

The object has been to have a series of articles which would cover the whole question of the relation of the woollen manufacture to the tariff.

In the first number of this year, the specious arguments of the wool dealers of New York against the present wool and woollen tariff are answered, and so efficiently that the writer of the New York Wool-Trade Report has declared that he shall retire from the field. This article, although written by

the Secretary, derived its principal value from the suggestions and notes given by two of the oldest and most respected members of the Association, Mr. ROBERTS and Mr. BIGELOW.

The second article, the leader in our next issue, on "The Alleged Inferiority of American Woollens," has been acceptably received as complete exposure of the ignorance and assumptions of a celebrated champion of free-trade, who occupies the chair of political economy in our of the colleges.

A third article, written at my request, and with my assistance, by Mr. GEORGE GEDDES, of New York, the highest authority on wool-growing, except Dr. RANDALL, who is unhappily disabled from writing, illustrates the happy result of the policy of the Association upon the wool-growing interests.

A fourth article, which will appear in a future number, will show, by numerous examples, that protection has proved a boon to the consumer of woollen goods. These four articles will cover the whole question involved in the discussion of her wool and woollen tariffs. The three first-named articles have been stereotyped, as will be the fourth; and it is proposed to print the whole in a single pamphlet, for distribution to members of next Congress, which can be done at only the cost of paper and press-work. Thus much for the most important work of the Association, omitting less important details.

But the question occurs, Does the work of the present year, and, indeed, of the last ten years, which has cost many thousand dollars, pay? In a word, has the Association proved of any benefit to the woollen manufacturers? I have said, in my former reports, that no satisfactory conclusion can be drawn from the results of a single year; and that we must take longer periods to determine the result of any work commensurate with the magnitude of the field which we have had to occupy. The time has now happily come when we can contemplate with satisfaction, and even with pride, the results of the policy of our Association. The great work and distinguishing feature of this Association has been the inauguration of a policy of legislation which recognizes the equal claims of the manufacturer and the grower of wool. Our adherence to this policy, originally as-

sented to by all, has driven from our body many of our original members, who expected to realize in a few months what could only be effected in years. In spite of our gradually decreasing members, a small though faithful band of far-seeing manufacturers have remained true to the original policy of the Association, and have preserved not only the Association, but the tariff, which was its work. May we not, then, be pardoned for the complacency with which we regard the results of a policy which we have persisted in advocating in the face of so much indifference and opposition from the very class of manufacturers who have been most benefited by our work?

Let me, then, briefly enumerate some of the unquestionable results of the tariff of 1867:—

1. In the first place, through the influence of that tariff, we have kept command of our own markets in spite of the war and the disturbances at its close,—in spite of the activity of foreign manufactures, unequalled in any foreign period,—in spite of the venomous denunciations of several reformers and free-trade doctrinaires, such as the "Evening Post" and Professor Perry, of the quality of our goods (see Professor Perry's article in the "Evening Post"),—and in spite of the financial difficulties of the last five years. There has been an increased consumption of our goods at home, in proportion to the consumption of foreign goods; and the hold upon our own markets has become so strong that we shall derive the principal advantage from a restoration to financial prosperity.

2. It is proved by official tables that, taking the five years before the passage of the tariff of 1867, and five years after, while the proportion of foreign goods generally has increased forty-five per cent, the importation of woollen goods proper has diminished thirty-one per cent, and this ratio is still held. No other cause for this can be given, but the prohibitive effect of the tariff upon foreign woollens.

3. The fifty cents per pound on foreign woollen goods, given us in exchange for the increased duty on wool, has effectually shut out the low goods of Europe, and especially of England, and has given us a market for the goods which can be most

advantageously made, and are peculiarly fitted for our wools. It has given us the almost exclusive command of the most convenient and profitable market, — that of the large clothing houses, who, owing mainly to this tariff, obtain seven-eighths of their cloths from American mills.

This tariff, it is true, has not prevented home competition, by which the consumer has been benefited. But if the foreign cloths had been admitted, there would have been no American mills in existence to compete with each other. I need not remind you that this fifty cents a pound, which has been the salvation of our mills so far as they exist, was secured by our concession of the ten cents specific and eleven per cent *ad valorem* duty on foreign clothing wools.

This has been the *bête noir* of a certain class of the cloth makers, and especially of wool importers. It was forced upon us, and most reluctantly conceded. But how has it worked? It has introduced in the Pacific and trans-Missouri States what has never existed in this country before, a system of wool-growing as a special business, of the same order as the Australian or South American wool-growing. In the older States, wool-growing has been pursued with small flocks as an adjunct to other husbandry. In the Pacific States it has been organized on a grand scale. It is conducted, not by farmers, but by capitalists; who have not taken up the business on caprice, but on the inducements offered by the high protective duty on wool. Like all business conducted by capitalists, it is pursued scientifically and systematically. The flocks are being systematically improved. There is capital to do it, and intelligence to conduct it. With flocks of a hundred thousand sheep or more owned by a single grower, there can be secured a uniformity in the clip such as is found in the Australian wools, and cannot be found in the clip from five hundred isolated farmers. The wool of California is improving, and must continue to improve, from the causes I have mentioned. In 1868, the Pacific product was 15,000,000 pounds; in 1870, 23,000,000; in 1874, 39,000,000. This year it will reach 50,000,000. The product is not only increasing, but increasing in an accelerating ratio.

There is land enough unoccupied for this increase to go on indefinitely.

The effect of this increase already has been a marked reduction in the prices of wool. It is the opinion of intelligent judges that clean wool, adapted to general product of our mills, is now as cheap in this country as in the manufacturing countries of Europe. Certainly, it is cheaper than when the tariff of 1867 was passed. This has been the legitimate result of protection, and it is the most marked example of recent times illustrative of the fact that the protective duty is not a tax upon the consumer. It was upon the theory that the duty is a tax, or out of abundant caution, that the specific duty on cloth was raised twenty-five cents. If it is true that the cloth maker, at the present time, obtains his wool at a lower price than in 1867, and that the whole increase of specific duty on cloth by that tariff is so much added to his protection, are not the cloth makers the last men who should ask for a revision of the present tariff?

But it is said that the development of wool-growing in the Pacific States has been secured only by the arrest of sheep husbandry in the older States. Sheep husbandry in these States is not arrested: it is only being changed in its character. We already see the results of this change in the increase of combing-wools and mutton sheep. The largest manufacturer of braids in this country informed me, last spring, that he should obtain, this year, all his supply of combing-wools from fleeces grown in the United States. But I prefer to rely on this point upon the matured opinions of a high authority on wool-growing in the United States, Mr. GEORGE GEDDES, who has given his views at great length in our "Bulletin." Mr. GEDDES meets squarely the question before us. He says:—

"The question comes up, Can wool be profitably raised on the high-priced lands of the East, with the immense pressure of competition from the West, that in a few years we must see in full force? Yes. The East will continue to raise wool, and will increase its production, in the face of this Western competition."

After quoting facts, first published in this country in our "Bulletin," showing, from a summary of the sheep industry of Great

Britain, that on the highest-priced agricultural lands in the world the sheep is the most profitable animal to raise for the markets, and the best animal to manure the land, he continues : —

“ Already our farmers, in the older parts of our country, are turning their attention to the raising of such sheep as have proved themselves to be so profitable in Britain, and are making crosses between these breeds and the American Merino, producing a very valuable animal in all respects. The pressing demands of our manufacturers for long wool for combing and the manufacture of the now so fashionable and valuable worsteds and dress goods, will cause a very rapid increase of flocks derived from the English breeds and their crosses with the Merino; and the increasing demand for good mutton, and the remunerating prices paid for the best grades, will soon teach our farmers, through their pockets, in which direction lies their road to more profitable methods of conducting their business than any they have before known.

It is not easy to see any good reason why the older sections of our country, having great cities and manufacturing centres for markets, should not follow the example of England in this matter. It has been proved by the best test, that of actual trial, that our soils and climate are well adapted to these heavy sheep. Nothing of uncertainty on this subject remains but the uncertainty of our national legislation. A policy of free-trade in wool and woollen goods would for a while destroy our purchasers of wool, and ruin both branches of the business. If the existing revenue laws can be allowed to remain, we may reasonably hope that at least the present prices of our wool will be continued to us, and, if so, we can continue to expand the production. The business will in the older parts of the country be a close one, yielding very small direct profits, but indirectly so very valuable as the means of making manure to raise grain crops that it will go on; and more economy in food, housing, and general management will come in due time, as skill increases, and the mutton-producing sheep and the growing of grain will go hand in hand.”

After stating the remarkable results of Mr. Chamberlain in growing sheep, Mr. GEDDES continues : —

“ Having been raising sheep for many years in connection with grain, I add to this account of Mr. Chamberlain’s great success in improving a large farm from its own resources, my own experience,

which may be condensed into a single sentence. With about one sheep to the acre of cultivated land, pasture and meadow, we raise more bushels of grain on the average than we did when he had no sheep to manufacture our coarse forage into manure, and to enrich our pastures to prepare them for grain crops; and the land is constantly improving, and the crop increasing in quantity, and we have the wool and mutton produced by our flocks of sheep in addition, producing our crops on less acres and at less cost than we did before we kept the sheep.

"The Merino, as improved in the United States, will furnish the basis of cross-breeds with the English families; and new varieties, quite likely, will be thus established. In any event, there will continue in the Eastern States to be flocks of the purest bred Merinos, handled in the best manner by breeders of experience, from which the blood must be drawn to keep up and improve the great flock of the far West.

"The raising of wool in the West and South-West must be conducted in a manner very unlike that of the East. Large flocks, some of them perhaps migratory, and having great ranges of pasturage, with very little winter housing or feeding of forage, supporting themselves with little attention from the shepherds as compared with the care given in the East, where the winters are severe. This Western system will render it any thing but profitable for the flock owners to enter into that laborious process that is necessary to improve a breed, by themselves raising the animals that are to infuse constantly new energy and merit into the great flocks that, under the management they will have, will constantly degenerate unless kept up by frequent infusions of the blood of vastly better individual animals. So these Western flock masters will make a constant demand on the Eastern flocks for breeding animals, and the Eastern breeders will find their profit in supplying that demand.

"The great plains of the South-western trans-Mississippi States and the Pacific States give a field for the production of fine wools equal in all respects to Australia or New-Zealand, and superior to South America; and when American energy and skill shall have once taken hold of the business of wool-raising on these great plains, this nation will become one of the great sources of the world's supply of fine wool, and from these plains vast exportations will be made.

"The Eastern States will adopt a plan of sheep-raising similar to that of England; and, if our city population continues to increase

as in the past, it would be hard to assign a limit to the home market for mutton and the wool of the best mutton-producing breeds."

In view of these facts, our Association, which has been the most powerful of all the agencies which have operated upon American sheep husbandry, has claims for support and recognition upon higher grounds than the mere selfish interests of manufacturers: while it is strictly a money-saving and money-earning institution to the wool manufacturer,—saving by acting as a perpetual insurance against hostile legislation; earning by giving him the home market for his goods, and reducing the cost of his wool,—it does infinitely more. Above all other industrial associations, it is national, patriotic, and civilizing in its objects. Cheapening the first material necessity of life,—animal food,—and cheapening the second necessity,—clothing,—it adds comfort to every family in the land. Promoting an improved system of husbandry, especially as applied to wheat lands, it aids in enlarging our agricultural resources,—the main basis of national wealth. Allying the farmers of the country to the protective cause, it is the chief pillar of the protective system which shields every industry. How freely is the wealth of public-spirited men poured forth to support what are called the liberal institutions of the land,—the colleges, libraries, museums,—which have no more unselfish and patriotic objects than our own institution, and whose results are vastly less definite and tangible than our own. More than fifty thousand dollars was given last year to found a school of Zoölogy at Penikese. It has been scattered to the winds, and the school is closed. A hundred thousand dollars has supported this Association for ten years. The money value of our institution can be counted by millions. See the saving to manufacturers by the repeal of the internal revenue law. Its influence in the future cannot be measured. Disband our Association if you will to-day: our publications will live in the public libraries; our example of condensing into a potent unit the discordant elements of a vast industry will remain; the sound political economy we have inculcated will continue to bear fruit; and the examples of business wisdom, combined with patriotic sentiment, seen in the small but noble band who so faithfully came

up here from year to year, illustrating how few the men are who control society, will find imitators. A good work may cease : it can never die.

The committee appointed to make nominations reported a list of officers for the ensuing year. Upon the reading of this report, it appeared that the name of Mr. J. WILEY EDMANDS was continued for President. The Secretary read a letter from Mr. EDMANDS expressing his desire to withdraw from the presidency of the Association.

The Secretary, moreover, stated to the meeting his conviction that Mr. EDMANDS's purpose in this matter was fixed.

A telegraphic communication was read from Mr. E. B. BIGELOW urging the importance to the Association of Mr. EDMANDS's continuance as President.

Most of the members present informally presented the same views. Mr. MAXWELL offered the following resolution, which was passed unanimously :—

Resolved, That this Association, appreciating the great value of Mr. EDMANDS's position, as President, to all branches of the wool manufacturing interests, urge upon him that he owes it to this Association not to withhold, at this critical period, the benefits of his official advice and his eminent influence as a business and public man.

The meeting thereupon proceeded to the election of officers for the ensuing year, and the following were unanimously chosen :—

PRESIDENT.

J. WILEY EDMANDS Boston, Mass.

VICE-PRESIDENTS.

J. W. STITT New York, N.Y.

LUCIUS P. PORTER New Brunswick, N. J.

GEORGE ROBERTS Hartford, Ct.

TREASURER.

SAMUEL FAY Boston, Mass.

SECRETARY.

JOHN L. HAYES Boston, Mass.

DIRECTORS.

Maine.

J. H. BURLBIGH	South Berwick.
S. O. BROWN	Dover.

Massachusetts.

E. R. MUDGE	Boston.
A. C. RUSSELL	Great Barrington.
AMORY MAYNARD	Boston.
C. P. TALBOT	Billerica.
THEODORE POMEROY	Pittsfield.
CHARLES L. HARDING	Boston.
JAMES A. SMITH	Cherry Valley.
ERASTUS B. BIGELOW	Boston.

New York.

STEPHEN SANFORD	Amsterdam.
R. H. THURMAN	Troy.
THOMAS FITZINGER	Waterloo.
SAMUEL HARRIS	Catskill.
F. H. FARNHAM	Troy.
ANDREW ROOT	Cohoes.
H. S. RANKEN	Troy.

Pennsylvania.

R. D. NESMITH	Johnstown.
CHARLES SPENCER	Germantown.
CLEMENT H. SMITH (of William Wood & Co.)	Philadelphia.
GEORGE P. EVANS	Philadelphia.

New Hampshire.

D. H. BUFFUM	Great Falls.
DANIEL HOLDEN	Concord.
ALMON HARRIS	Fisherville.
JOHN HALL	East Rochester.
SAMUEL R. PATSON	Manchester.

Vermont.

JOSEPH SAWYER (Burlington Woollen Co.)	Winoochi Falls.
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Rhode Island.

J. T. FISK	Pascoag.
A. L. SAYLES	Pascoag.
DARIUS GOFF	Pawtucket.

Connecticut.

GEORGE MAXWELL	Rockville.
GEORGE W. CAPRON	South Coventry.
SABIN L. SAYLES	Dayville.
E. C. CLARK	Rockville.

New Jersey.

WILLIAM DUNCAN	Franklin.
DAVID OAKES	Bloomfield.
JONATHAN EARLE	New Brunswick.

Ohio.

ALTON POPE	Cleveland.
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Illinois.

GEORGE S. BOWEN	Chicago.
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Minnesota.

PARIS GIBSON	Minneapolis.
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STANDING COMMITTEES.

Finance.

J. WILEY EDMANDS	Boston, Mass.
C. FITTON	Rockville, Conn.
J. W. STITT	New York, N.Y.
JAMES A. SMITH	Cherry Valley, Mass.

Statistics.

GEORGE WM. BOND	Boston, Mass.
JAMES ROY	West Troy, N.Y.
J. V. BARKER	Pittsfield, Mass.
E. L. STIMSON	Cohoes, N.Y.
JOHN T. WARING	Yonkers, N.Y.

Raw Material.

J. W. BLAKE	Boston, Mass.
J. J. ROBINSON	Rockville, Conn.
S. J. SOLMS	Philadelphia, Pa.
A. LAWRENCE EDMANDS	Boston, Mass.

Machinery.

GEORGE L. DAVIS	North Andover, Mass.
C. FITTON	New Britain, Conn.
THOMAS F. EDDY	Fall River.
SAMUEL HARRIS	Catskill, N.Y.
ROBERT MIDDLETON	Utica, N.Y.

After the election of officers, Mr. PORTER submitted the following resolution, which was unanimously adopted : —

Resolved, That a committee of three members, to be nominated by the Chair, be appointed to confer personally with Mr. J. WILEY EDMANDS, and urge, upon public considerations, that he do not persist in his resignation of the presidency of the Association.

The Chair appointed Mr. BIGELOW, Mr. BURLEIGH, and Mr. DAVIS as that committee.

After an informal discussion of the financial affairs of the Association, in which the hearty co-operation of all the members was assured, the meeting adjourned.

OFFICIAL CORRESPONDENCE ON THE WASHED COMBING-WOOL QUESTION.

ON the 5th day of November, the manufacturers of worsted goods were astounded by the publication of the following circular which appeared in the Boston newspapers : —

COLLECTOR OF CUSTOMS, Boston, Mass. : —

SIR, — I enclose herewith a report from Special Agent, J. W. Davis, addressed to the solicitor of the Treasury, under date of the 12th instant, and referred by the latter officer to this department, in relation to the matter of wool importations at your port.

The first point made by Mr. Davis is that a great many invoices of wool are passed at your port, where the currencies in which such invoices are made out are not taken at the respective values

assigned to them, under the law, by the Secretary of the Treasury. So far as this point relates to the peso fuerte and doubloon of the Argentine Republic, it is for the present disposed of by the department's instructions of the 15th instant. Whether the statement of Special Agent Davis was intended to have any broader application, the department is not informed, and may therefore find it necessary to make this matter the subject of further correspondence with that officer.

The second point raised in said report was disposed of in department's instructions to you under date of the 21st instant.

The third point is in substance that some invoices show a greater number of pounds of wool than is returned by the weighers; the effect of which is that, if the invoice quantity is taken as correct, and is divided into the total value, the price per pound will be reduced to twelve cents or less, with duty at three cents per pound; whereas, upon the basis of the weigher's return, the price of the wool would be over twelve cents per pound, with a duty at six cents per pound. It is understood that the importers claim, that the excess of weight as shown by the invoice can be accounted for on the theory that there is a loss in the weight of the wool on the voyage of importation. Without considering at the present time what force should be given to this view, if the fact of such loss in weight were established, the department is not disposed to accept it in the absence of any satisfactory evidence to support it. On the contrary, it has been reasonably supposed that, if there be any change in the weight of wool on the voyage of importation, it is by way of increase on account of the absorption of moisture rather than decrease from other causes. Under these circumstances, the department must assume that the weigher's return is correct, and therefore instructs you to assess duties on the basis of such return.

The fourth point presented in said report involves the same question which was raised in department letter to you of the 14th ultimo, and which was reported upon by you under date of the 22d ultimo, a report from the appraiser being also submitted,—viz., whether the washing of wool prior to importation can be considered such a change in its condition as to subject it to a

double duty under the second paragraph of Class 3, in Schedule L, of the codified tariff, which reads as follows :—

“ And the duty upon wool of the sheep, or hair of the alpaca, goat, and other like animals, which shall be imported in any other than the ordinary condition as now and heretofore practised, or which shall be changed in its character or condition for the purpose of evading the duty, or which shall be reduced in value by the admixture of dirt, or any other foreign substance, shall be twice the duty to which it would be otherwise subject.”

In considering this question the general scope and object of the tariff provisions relating to duty on wool must be considered. First, there is a provision for making the duty on wool of the first class, when imported washed, twice the amount to which it would be subject if imported unwashed. Next there is a provision for making the duties on wool of all classes, when imported scoured, three times that to which it would be subject if imported unwashed. Then comes the third general provision above quoted, on the construction of which an answer to said question depends.

I am of opinion that, to make the operation of the act consistent, said provision must be regarded as embracing all classes of washed wool, and that consequently the provision first quoted, relative to wools of the first class, must be deemed to have been merged in the said general provision, which is so broad in its scope as to necessarily include all classes of wool; and the provision first quoted is consequently, to that extent, simply re-enacted in the third. Any other interpretation of the statute would permit a discrimination in favor of washed wools other than those of the first class, which is not reasonable to suppose Congress intended. You will therefore impose upon washed wools of any class double the duty to which wools of that class would have been subject if imposed unwashed.

I will thank you for the return of the enclosure, as also of the report of Special Agent Bingham dated the 7th instant, which was transmitted to you under date of the 21st instant.

I am, very respectfully,

C. F. BURNAM, *Assistant Secretary.*

On the evening of the publication of the above letter, Friday, the Secretary of the Association, under instructions, repaired to Washington. On Monday morning, the 8th, the President of the Association, Mr. Edmands, arrived at Washington, and, facilitated by the kindness of Senator Morrill, of Vermont, had an interview with the Secretary of the Treasury, and procured the *temporary* suspension of the above order. On the same day the Secretary of the Association filed with the department the following letter :—

EBBITT HOUSE, WASHINGTON, Nov. 8, 1875.

Hon. B. H. BRISTOW, *Secretary of the Treasury.*

SIR, — In an interview this morning with Hon. J. Wiley Edmands, President of the National Association of Wool Manufacturers, with a consideration for the interests of manufacturers which is gratefully appreciated, you gave him the assurance that the recent instructions of your department in relation to the liquidation of the duties on washed combing and carpet wools (Classes II. and III.) would be temporarily suspended, and requested that such reasons as might be urged for the final reversal of those instructions should be given in writing. As the representative of the National Association of Wool Manufacturers, in the absence of its president, I have the honor to comply with that request.

I. First let me call your attention to the disastrous and wide-spreading effects of the instructions referred to. They affect all the Canada combing wools, the principal raw material of our worsted manufacture, these wools having almost invariably been imported in a washed condition to the extent of not less than six million pounds a year, chiefly from Canada, besides a large class of carpet wools.

The duties on Canada combing wools, as ordinarily imported, — that is, costing over 32 cents per pound, — have been considered as fixed beyond question at 12 cents per pound, and 10 *per centum ad valorem*, making the present duty per pound 16½ cents. The duty on washed Cordova and other washed carpet wools has been considered fixed beyond question at 6 cents per

pound, the cost being over 12 cents per pound. It takes two pounds of Canada wool to make a pound of worsted fabric. The construction of the department, if persevered in, thus adds 33 cents to the duty paid on every pound of worsted goods; making the whole duty 66 cents, and 18 cents on every pound of carpet worsted made of Cordova or Donskoi washed wools, as three pounds of Cordova washed wool are required for a pound of Cordova worsted.

All the contracts which are made ahead by the worsted manufacturers for their products — such as dress goods, braids, worsted coatings, bunting, &c. — are based upon the old duty of $16\frac{1}{2}$ cents per pound of wool, or 33 cents per pound of worsted; and to add 33 cents to the duty on a pound of the fabric, it is obvious, is disastrous to the worsted manufacturer. In fact, the manufacture will be arrested, orders for wool suspended, and contracts for goods thrown up.

II. The instructions referred to were made under misapprehension as to facts, and should therefore be absolutely rescinded. I would remark here, that such misapprehension is no reproach to the department. It has always been admitted that no branch of our revenue laws is so difficult of construction by inexperts as the provisions relating to wool. A technical knowledge of the exact meaning of terms, and of facts which enter into that meaning, which can hardly be had outside of the trade, is required. Again, a full knowledge of the peculiar historical circumstances attending the enactment of the wool tariff is demanded for its construction.

Permit me to recall those circumstances.

The provisions of our codified laws relative to duties on wool and woollens are but re-enactments of the provisions of the Act of 1867; by the terms of the codification nothing being added to or subtracted from the laws existing at the time of the codification.

The tariff of 1867 was enacted under extraordinary circumstances, which, unlike ordinary cases of legislation, must be taken into consideration in its interpretation. This bill was adopted by Congress without discussion, on the official recommendation

and report of the commission appointed for the revision of the revenue system of the United States. This commission, in pursuance of the law authorizing them to take testimony, called together the representatives of the two branches of the woollen industry of the United States, and embodied the results of their agreements and representation and testimony in a report submitted to the Secretary of the Treasury, and officially published by him, and also submitted by him to Congress.

The tariff of 1867, with the exception of the substitution of the word "eleven" for "ten," was, so far as wool duties are concerned, precisely that recommended by the Revenue Commission, and agreed upon by wool growers and manufacturers. The provisions relating to woollens were the same, with trifling exceptions. This report of the Revenue Commission, stating in details the principles upon which the tariff was based, and giving the testimony upon which the proposed tariff was urged, is a part of the contemporaneous history of that legislation, given under official sanction.

It must be received to interpret the tariff just as any admitted facts of history are received in the interpretation of all laws. For administrative officers especially to ignore the interpretation of the law made at the time by the parties who framed it, recorded in official documents at the time, and not prepared since to make up a case, would be an outrage on common-sense.

From these reports it appears that the main principle which formed the basis of the tariff of 1867 was that, after clearly fixing the duty on wools, "all manufactures of wool or worsted should have a duty equal to 25 per cent net; that is, 25 per cent after reimbursing the amount paid on account of wool, dye-stuffs, and other imported materials used in such manufacture, and also the amount paid for the internal revenue tax." (See Joint Report of Wool Growers and Manufacturers, page 431 of Report of Revenue Commission.) This was practically effected by making the specific duty on goods exactly compensatory of the duties on the wool and dye-stuffs. (See pages 444 to 450 Report of Revenue Commission.)

Again, it will be seen in all the pages of the Report that

the main object of the law in fixing the duties on wool was to increase the duties on clothing wools, — the wools entering chiefly into competition with American wools. The arguments of the wool-growers for increased protection were applied solely to this class of wools. The duties on them were raised from an average of 5 cents to 10 cents, and 11 per cent *ad valorem*. The duties on combing and carpet wools were not sought to be increased, and in fact were not increased. While the anxiety for the most stringent provisions for the clothing wools was so great that both committees of wool growers and manufacturers agreed that, "The provision for the duty on clothing wools should be so worded as most effectually to prevent them from being admitted at a less rate of duty." (See p. 430 Revenue Report.) These two objects must be clearly borne in mind, to determine the intent of the law in fixing the duties on the several classes of wool.

The intent to give an increased, and at the same time most stringent, protection to clothing wools sufficiently explains why the duty upon wools of the first class, which shall be imported *washed*, shall be twice the amount of duty to which it would be subjected if imported *unwashed*; and why this provision was not made to apply to the combing and carpet wools. All the clothing wools had been invariably, under the tariffs of 1857, 1861, and 1864, imported in an *unwashed* condition. If they could be imported washed, they would evade the duty intended, and the provision was made to prevent it. No injury was given to the trade in clothing wools, by preventing their importation in a *washed* state, as it was not the custom to import *washed* clothing wools. On the contrary, the wools of Class II., and certain wools of Class III., had been always imported in a washed condition. To apply the provision of doubling the duty to them, in addition to the higher duty already imposed on washed wools of these classes, as hereafter explained, would have been a flagrant disturbance of trade, and a practical prohibition which Congress could not have intended, and which every man familiar with the legislation knows was not intended.

It will be seen by the Report of the Revenue Commission that the two branches of the bill proposed by the wool-growers and wool-manufacturers, which afterwards became the law of 1867, were accompanied by the most detailed and precise explanations of the effect of each of the provisions of the proposed act; and these explanations furnish the most unequivocal *contemporaneous* testimony as to the interpretation of the bill which became a law. The testimony of the manufacturers at the time gives the most unequivocal evidence of their views as to the duties proposed in the act for washed wools of Classes II. and III.

Thus the carpet manufacturers say (p. 468 Report of Revenue Commission): "For carpets, both washed and unwashed wools are used. The washed wools, such, for example, as Donskoi, Cordova, Montevideo, Rio Grande, and Persian, pay a duty of 6 cents a pound, &c.; and the unwashed, such as Smyrna, Chilian, Valparaiso, and other South American wools, pay a duty of three cents a pound." The Executive Committee of the Manufacturers, in their statement accompanying the bill proposed, say: "The duty on the *washed* wool used in the manufacture of ingrain carpets is 6 cents per pound, and on unwashed wools 3 cents per pound." (Report of Rev. Com., p. 459.)

Again, the committee say (p. 459 Rev. Com.): "The duty on Canada wool is 12 cents per pound, and 10 per cent *ad valorem*, which is equal to $16\frac{1}{2}$ cents per pound; and, as two pounds of wool are required for one pound of worsted, it follows that the duty on the wool in the worsted amounts to 33 cents per pound.

"The duty on Cordova [before shown to be washed wool], and other similar wools, is 6 cents per pound; and, as three pounds of such wools are required to make one pound of worsted, it follows that the duty on the wool in the worsted amounts to 18 cents per pound. Now, as four pounds of this worsted are used to one pound of the Canada, the average amount of duty paid on the wool in the worsted used is as follows:—

4 pounds Cordova and Worsted at 18 cts. per pound . . .	72 cts.
1 pound Canada Worsted at 33 cts. per pound . . .	33 cts.
5 pounds Total.	Total . . . 105 cts.

"105 cents divided by 5 give 21 cents per pound. Hence, the average duty on the wool for one pound of worsted, 21 cents."

This, it will be remembered, is the basis of the specific duty placed, in the tariff of 1867, on carpets.

If it was intended that the duty on washed, combing, and carpet wools should be doubled, the duty on the wool for one pound of worsted should be 42 instead of 21 cents. But the duty actually given in the Act of 1867, to reimburse the carpet-maker the duty on his wool, recognizes wool duty as only 21 cents.

Still again the Executive Committee of the Manufacturers say: "The duties on Canada combing wools for worsteds [dress goods, exclusive of carpets] are made as provided in the proposed tariff on wool, and will be 45 cents per pound; the present average price of Canada wools, 12 cents specific, and 10 per cent *ad valorem*, or 16½ cents per pound. Two pounds of wool being required for a pound of worsted goods, the amount of duty on the wool for a pound of worsted goods paid by the manufacturers will be 33 cents." (Report of Rev. Com., p. 450.)

It is evident from the above, drawn from the publications of the Treasury Department, that all the contemporaneous interpretations of the parties who devised the tariff of 1867, and furnished the details of explanation for the instruction of Congress and the country as to its provisions, unequivocally and positively exclude the idea that the duty on washed combing and carpet wools should be doubled. All the liquidations of duties at the custom-houses since 1867 to the present time have been to the same effect. It is the construction of the tariff given by the experts in the wool-trade.

The Report of the Wool-Trade Committee of the city of New York of November 27, 1874, says: "The advantage ostensibly given by our tariff to worsted wools of English blood, Class II., by admitting them *washed* at the simple rate of duty on fine

unwashed wools, becomes practically of limited value," &c. Indeed, the bare suggestion of the interpretation made by the department was never heard or dreamed of in any quarter until announced last week, when it came like a thunder-bolt from the clear sky.

No one can doubt that the tariff of 1867, prepared with such extraordinary precautions, was intended to be a harmonious whole, providing equally for the interests of both wool growers and manufacturers. No one can doubt that the duties on manufactures were intended to be adjusted to the duties on wool; that the specific duties on goods were intended to be compensatory of the duties on wool. But, by the construction given by the department, the vast interests of the worsted and carpet manufactures receive only one-half of the reimbursing specific duties which they are entitled to; and, in fact, manufacturers are driven by the law, which held out the false promise of protection, to stop their mills.

But it is said that it is not reasonable to presume that Congress intended to make a provision for the duty on washed wools of one class which should not apply to other classes. We maintain that the duties imposed by the law upon the carpet and combing wools *did* contemplate the fact that certain classes of these wools were imported unwashed, while others were imported in a washed condition. Every person familiar with carpet wools knows that the minimum of 12 cents, at and below which the duty on carpet wools should be 3 cents, was fixed at that amount because at the time all wools costing that sum and less were *unwashed* wools, while wools costing more than 12 cents owed their higher cost to the fact that they were washed. The higher duty of "6 cents" was therefore imposed upon them because they were washed. The duty on the washed carpet wools was doubled precisely as in the case of clothing wools, although by different terms,—by implication so well understood by the framers of the laws as to need no express declaration. The statement of the carpet manufacturers confirms this when they say: "The duty on *washed* wools, used in the manufacture of ingrain carpets, is 6 cents per pound, and on

unwashed wools 3 cents per pound." The high duty of 12 cents per pound, and 10 per cent *ad valorem*, placed on combing wools costing over 32 cents per pound, recognizes also the fact that the increased cost is due to the wool being washed. The construction claimed by the department would have the effect to *quadruple* the duty on washed carpet and combing wools, while the washed clothing wools are only doubled in duty.

It is nowhere pretended that the law, in express terms, doubles the duty on washed carpet and combing wools, although it is very explicit in doubling the duty on washed clothing wools. This express mention of clothing and omission of other wools ought, upon the well-known rule of interpretation, "*enumeratio unius exclusio alterius*," to be conclusive of the intent to omit these words.

But it is said by the department that the duty on washed combing and carpet wools is doubled by the following proviso : —

"That any wool of the sheep, or hair of the Alpaca goat and other like animals, which shall be imported *in any other than the ordinary condition*, as *now* and heretofore practised, or which shall be changed in character or condition for the purpose of evading the duty, or which shall be reduced in value by the admixture of dirt or any foreign substance, shall be subject to pay twice the amount of duty to which it would otherwise be subjected, any thing in this act to the contrary notwithstanding."

I would respectfully suggest that it has hitherto been the opinion of those most familiar with the wool-trade, that this provision did not have washed wools in view, nor any change of condition which, like washing, would better the character of the wools. It has been believed that it did not contemplate a change of condition which would make the wools of higher value, and therefore subjected to a higher duty, such as would be effected by washing; that it had solely in view the fraudulent admixture of foreign materials for the purpose of bringing the wool into a class paying the lower duty. It has been supposed that it had in view a practice, which did formerly prevail

in South America, of exporting Mestiza clothing wools in the dirtiest possible condition, so that they should come in at a valuation less than 12 cents, and therefore at a duty of only 3 cents. This practice, as it affected competing American merino or clothing wools, was bitterly complained of by the American wool-growers, who caused the insertion of this proviso to prevent fraudulent evasion of the duty on clothing wools.

This view, and in fact all the statements hitherto made, have relation to the purely legal interpretation of the law where there is room for difference. The arguments hitherto presented in this paper have been affirmed out of abundant caution, in view of the vast importance of the issue. The strongest ground upon which to claim an absolute reversal of the instructions of the department remains to be presented. It is one where there is no room for difference of opinion, as it involves simply a question of fact.

I cannot doubt that in the application of this proviso to combing and carpet wools there has been a misapprehension of facts, which has alone led the department to its construction, — a misapprehension perfectly natural in experts in the intricacies of the wool-trade.

The department had no means of knowing the essential fact, which we propose to substantiate by abundant testimony, that combing wools, — particularly Canada combing wools, — with merely accidental and unimportant exceptions, have been *invariably*, "heretofore," before the time of the passage of the tariff of 1867, and are now, or at the time of the passage of the act, imported in a washed condition; that the condition of being washed is the ordinary condition of such wools as now and heretofore practised.

The fact is probably not familiar that these wools are not and never have been washed by the wool dealer, importer, or manufacturer. They are washed by the farmer, on the sheep's back, before shearing. *Washing* differs essentially from *scouring*, which makes absolutely clean wool, while washed wools contain a large portion of the yolk, or natural grease of the fleece. Canada combing wools, except through accident, never

have been and cannot be found in the market in any other condition than that of being washed; they are not changed in character or condition; and the same thing is true of *washed* carpet wools. But the *proviso* clearly means that the wool to be doubled in duty must be imported in other than the ordinary condition, or changed in its character and condition, "for the purpose of evading the duty."

Can it be for a moment pretended that the Canadian farmer, who has washed his sheep from time immemorial, does it to evade the duty? or that the American importer, when he can get no other Canadian combing wools but those which are washed, imports washed wools to evade the duty? This manifest and natural misapprehension of facts makes it not only easy and proper, but eminently creditable, to the department to rescind a decision founded upon such misapprehension; and such a course will increase the public respect for a department already signalized not only by the vigilance but by the justice of its administration.

Permit me to recapitulate the reasons which we urge for absolutely rescinding the instructions referred to:

1. They are disastrous to the worsted manufacturers of the country, as they double the duty on all wools contained in their goods; and also affect injuriously carpet manufacturers.

2. Contemporaneous evidence from official sources shows conclusively that it was not the intent of the law of 1867 to double the duty on washed combing and carpet wools.

3. Provision for placing a higher duty on washed combing and carpet wools had been already made in the law. To double the duties now would have the effect of quadrupling the duties on these wools, while the duties on washed combing wools are only doubled.

4. The *proviso* on which the instructions are founded was not intended to apply to washed wools, but to wools fraudulently reduced in value to bring them within the lowest duty.

5. The instructions of the department are founded on errors of fact, — facts naturally out of its cognizance. They assume that the washed combing and carpet wools have been imported

"in other than the ordinary condition as now and heretofore practised," or "have been changed in character and condition for the purpose of evading the duty;" whereas abundant proof is now offered to show that they have not been changed in character and condition; that they have not, *as ordinarily imported*, been changed in character and condition; that most of these wools have always been imported in a *washed* condition, and could be purchased in the market in no other condition.

I have the honor to be, respectfully, your obedient servant,

JOHN L. HAYES,

Secretary of the National Association of Wool Manufacturers.

BOSTON, NOV. 16, 1875.

JOHN L. HAYES, Esq.

SIR, — In reply to your inquiry whether it had been the invariable custom to import Canada wools in the washed state, I would say, that as far as I know it has been the constant custom of the Canadian farmers to wash their sheep before shearing, as it has been with the American farmers in the old States. By accident, however, both in Canada and here, or on account of sickness, some sheep escape washing, and an allowance — generally of one-third, or in some sections of one-fourth — is made for all fleeces found to be unwashed. If we sell a lot of fleeces, and nothing is said about it, in packing such fleeces are thrown out and weighed by themselves, and the customary allowance is made upon them. They rarely exceed 3 to 5 per cent, and in the majority of cases fall below this.

Of course, since the law of 1867, buyers in Canada for the United States reject the unwashed fleeces, which they have a right to do. I know of no importation of wools in any condition "other than the ordinary condition as now and heretofore practised."

Yours truly,

GEO. WM. BOND.

The reply from the Department to this letter and to another, giving additional facts and explanations, is as follows:—

TREASURY DEPARTMENT,
WASHINGTON, D. C., December 2, 1875.

JOHN L. HAYES, Esq., Secretary, &c., Boston, Mass. :

SIR,—Referring to your communications under the respective dates of the 8th and 23d ultimo, both relating to the views expressed by this department in a letter addressed to the Collector of Customs on the 26th of October last, on the question of duties applicable to washed wools, I now beg leave to enclose, as reply thereto, copy of a letter of this date addressed to the same officer upon the same subject.

I am, very respectfully,

B. H. BRISTOW, *Secretary.*

TREASURY DEPARTMENT,
WASHINGTON, D. C., December 2, 1875.

COLLECTOR OF CUSTOMS, Boston, Mass. :

SIR,—Referring to my communication under the date of the 10th ultimo, with reference to certain instructions contained in department's letter of October 26th last, relative to the imposition of double duty on washed wools, I have to state, that, having given the subject further consideration in its legal aspect as involving a question of statutory construction, I have arrived at the conclusion hereinafter stated.

Upon a comparison of the provisions relating to wool as contained in the respective tariff acts of June 30th, 1864, March 2, 1867, and June 22, 1874, — the latter being the revised or codified tariff now in force, — it will be perceived that in the latter an important change was made in the relative position of some of the provisions bearing on the question at issue, viz., whether washed wools of the second and third classes should or should not pay double the duty to which the same classes would be respectively subject if imported unwashed.

The act of 1864 contained a provision imposing the highest rate of duty on wools then established, viz., 12 cents per pound and 10 *per centum ad valorem* on all wool "imported in any

other than the ordinary condition," &c.; but contained no discriminating provision with regard to washed wools *eo nomine*.

The act of 1867 repealed the provision relating to wools imported in other than their ordinary condition; but, instead of affixing a specific rate of duty as before, provided that, under such circumstances, double duty should be exacted. This modified provision was followed by a further provision relating exclusively to washed wools of the first class, and to scoured wools of all classes.

In the revised or codified tariff of 1874 all the provisions of the act of 1867 are reproduced; but in different positions, and in such combinations as to leave it apparently an open question to what extent Congress intended to discriminate between the different classes of washed and unwashed wools. The provision relating to washed wools of the first class, instead of following, as it did in the act of 1867, the general provisions relating to wools of all classes, now precedes them; and the provision relating to wools imported in other than the ordinary condition, which, both in the act of 1864 and that of 1867, preceded those relating to scoured and washed wools, now follows them as a concluding general provision relating to all classes of wools.

In view of this fact, the department was of opinion that Congress intended there should be no discrimination with respect to washed and unwashed wools, as between the different classes thereof. Hence the ruling on this point contained in the instructions communicated to you under date of the 26th of October last.

It must be conceded, however, that there is no evidence before the department, outside of the statute, showing that Congress, in passing the revised or codified tariff of 1874, — although it changed the position of the provisions in question, — intended thereby to alter or disturb the effect of previous legislation, especially as it made no change in the language of former acts.

Other questions of construction have arisen under the act of 1874, as the result of bringing together provisions contained in different prior acts. A prominent illustration of this fact is found in Schedule K, where a provision for "timber, hewn or

sawed," taken from the act of 1861, is immediately followed by a provision for "timber, square or sided, not otherwise provided for," taken from the act of 1872, the duty under the former being *ad valorem*, and under the latter specific, while it is generally conceded that the two descriptive phrases used mean substantially the same thing.

The Attorney-General has expressed the opinion, in substance, that, where there is an ambiguity or apparent conflict in the act of 1874, recourse may be had to previous acts, for the purpose of explaining ambiguous or reconciling conflicting provisions.

Referring, under these circumstances, to the act of 1867, and to the provision therein contained imposing double duty on wools of the first class when imported washed, and triple duty upon wools of all classes when imported scoured, and to the fact that such provision *follows* the general one relating to the importation of wools in any other than their ordinary condition, — I am of opinion that, in the absence of indubitable evidence showing clearly the intent of Congress to change the pre-existing law (the only evidence of such intent being found in a change in the relative position of certain provisions contained in former acts), the department is not warranted in departing from the construction of those acts which has hitherto prevailed, but should rather leave for legislative action any defects in the existing law which may seem to need correction.

You will therefore regard the said instructions, under date of October 26th last, relating to the imposition of double duty on washed wools, as hereby rescinded.

I am, very respectfully,

(Signed) B. H. BRISTOW, *Secretary*.

THE WOOL-HAT MANUFACTURE.

*To the Secretary of the National Association of Wool Manufacturers.**

DEAR SIR, — In answer to your inquiry in regard to the manufacture of wool-felt hats, I will endeavor to give you what little light I possess on the subject.

Previous to 1822, hats were made from wool, by first carding the stock, and winding the web on a drum, thus forming it into a bat or lap, as it is sometimes called, or by carding and allowing the web to fall from the doffer on the floor. After this process, the wool was sold to hatters or dealers, in quantities to suit purchasers.

You must bear in mind that, at this period, this branch of manufacturing was carried on in very small shops in the country towns and villages, as well as in the cities; and as the beginning of a country town was usually a saw-mill and grist-mill, then a store and blacksmith shop, then the shoemaker, in due time the hat shop made its appearance, with a small dye kettle, a boss hatter, and one or two apprentices, who manufactured for the surrounding district. This hatting establishment had to get its stock from the city merchants, whose business it was to supply the hatter; so carded wool was furnished in bundles or bags, in such quantities as might from time to time be needed. The wool was not formed, as now, by winding the web on a wooden cone; but was manipulated in a carded state by the hatter, by means of the bow and bowstring, which he skilfully applied to the carded wool, until it was flattened out into a hat of somewhat irregular form; then, by very ingenious handling and putting a number of the bats together, the hat body in conical shape was finally formed. In this way hat bodies were formed for many years, until about the year 1822, when a machine was invented for forming wool-hat bodies. The machine operated by winding the web from the doffer directly on to the cone, and forming one body at a time; the

* This communication, prepared at our particular request, is furnished by the head of the largest wool-hat manufactory establishment in the country.

web being wound straight around the cone, without crossing in the least, and also leaving a hole in what is known by hatters as the tip.

This was one step in the way of forming the bodies by machinery, but was still very imperfect: the hole in the tip had yet to be "stopped" by hand.

The double cone former (now in use with many improvements), which crosses the web by a vibrating motion, and runs it from one end of the cone to the other, at the same time revolving on conical rollers, and covering the entire cone, tip and all, was invented and patented, about 1825, by a Mr. Grant, of Providence, R. I. This patent was considered in the trade as very valuable, and it certainly proved so.

Raymond Brothers, of Brooklyn, about 1825, invented a machine for forming, known as the railroad former, the cones being moved on a straight track in front of the doffer.

Thomas Waring, of Salem, N. Y., also invented, soon after, what was then known as the half-moon former. As a means of crossing the web, the whole former was moved in a half circle on a track in front of the doffer; but this mode of crossing was considered by Townsend & Grant as infringing on their patent, and led to protracted litigation, which finally terminated in favor of Townsend & Grant.

Previous to the invention of wool-hat-body formers, lamb's-wool only was used for this purpose, as the bowstring would not work except on the straight fibre of the lamb's fleece; but, subsequently, when the machine former came into general use, wool of any kind was used, provided it possessed the requisite felting property.

The introduction of these machines for forming hat bodies rendered the process of manufacturing comparatively simple, and had a tendency to cheapen the article, which increased the consumption; and from this period, say about 1828, hat manufacturers have been increasing, both in numbers and in their individual capacity for production.

I would here state that, from, say 1828 until about 1844, wool-hat bodies, to a large extent, were made from the fine Ger-

man Saxony lamb's-wool, and also the fine Spanish wools. These two kinds, it was held, possessed the best felting qualities then known; and the bodies, during the above period, were napped with fur, nutria, beaver, &c., and mainly used for dress hats, though many very common hats were made entirely of wool of any common native grade, and were in very general use by the working-classes.

In about 1845, the manufacturers, or those engaged specially in making the fine bodies for napping with fur, found their business dwindling year after year. The wool-hat body, napped with fur, was supplanted by a paper or pasteboard body, which, when shaped into a hat and glazed over with shellac and other gums, was covered over with silk plush. This was cemented fast to the body by a hot iron, and gave a very rich and glossy surface, and from its appearance soon became very popular; but it lacked durability, the paper body being so easily affected by dampness, that a gentleman, leaving home in the morning wearing his handsome silk hat, might be caught in a shower, and return with nothing but the soft wet plush. However, soon after, a fur body covered with plush was substituted, making an excellent article, which completely destroyed the business of the wool-hat body manufacturers; for the body made of wool would not answer for the silk hat. This change left the wool-hat formers with their machinery on hand; and they were either obliged to abandon their trade or to use their own bodies, making them heavier, and finishing them up into hats all trimmed and ready for use. This they did for several years, using mainly our common native pulled and fleece wool.

About 1845-46, some of the best manufacturers conceived the idea of making *fine* soft as well as stiff wool hats, in imitation of fur, — a very much finer article than had ever been used, — from our fine native and foreign wools mixed. This new departure soon became a success, and fine wool hats have since been the competitors of fur hats.

I will not here undertake to mention the improvements that have been made from time to time in the various departments of manufacturing: suffice it to say, that there are probably at this

time about three hundred sets of 24-inch cards in use in the United States in the manufacture of wool hats, with a capacity of turning out, say, fifteen dozen hats to the set, 4,000 dozen per day ; or, actual running time, say 275 days in the year, will give a yield of 1,237,000 dozen, or 14,850,000 hats per year ; at an average of \$9 per dozen, this would make a total of \$11,000,000 product per annum.

Of course, the actual running time of the above machinery varies greatly with the seasons ; and its prosperity is seriously affected by the low duty on its competitor, viz., hatters' furs, which, with great injustice to wool-hat manufacturers, are allowed to come in at twenty per cent duty, and hatters' furs on the skin entirely free ; while the wool-hat manufacturer, who makes an article mostly used by the working people, is required to pay from sixty to seventy per cent duty on any imported wool he may use. This is evidently an oversight in framing the present wool tariff ; and in justice to the wool-hat manufacturer, as well as the people of our nation, it should be changed, and furs made to pay a higher duty than wool. Under the present tariff, the rich and well-to-do people, who buy a fur hat simply because *it is* fur and of foreign production, get the luxurious article almost entirely free of duty, so far as raw material enters into its production, while the mechanics and working-men of the nation, who are the main consumers of wool-felt hats, must pay from sixty to seventy per cent duty on the raw material from which the wool hat is made.

The above policy of placing the highest duty on the article which is a necessity to the masses, and at the same time allowing an article of luxury to enter our ports almost entirely free, is (I think you will agree with me) one not hitherto practised by any other wise nation.

The policy of the old Congressional legislators previous to the war was to tax hatters' furs higher than wool, treating the article as one of luxury ; now the plan seems to be reversed, and wool, the necessity, compelled to pay three or four times as much duty as fur. You will see that in forming the tariff of 1867, and putting the high duties on wool, its competitor as raw ma-

terial for hats (hatters' furs) seems to have been ignored altogether. It was, without doubt, an oversight, yet one that should be corrected at the *earliest possible* day.

The cost of machinery owned and in the factories of wool-hat manufacturers is probably ten times greater than that in use by the fur manufacturers, and all of domestic production.

At present the low duties on hatters' furs have almost entirely destroyed the business of those who make the *finest* wool hats.

The wool-hat manufacturer, in a national point of view, should at least have equal consideration, because he uses the product of his own country, and yet he must have some foreign wool to mix with the native.

I remain, yours truly,

JOHN T. WARING.

SCIENTIFIC EXAMINATION OF WOOL AND HAIR FIBRE.

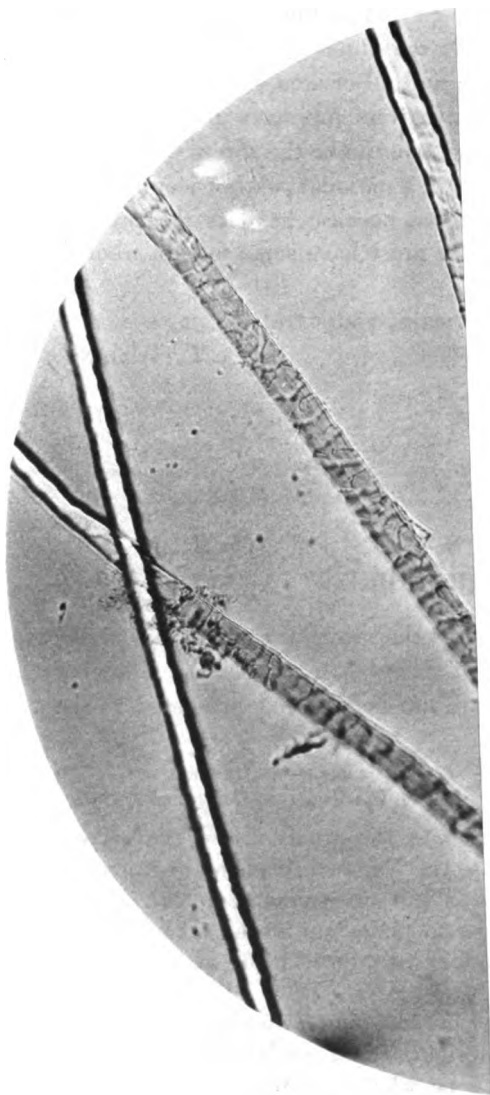
WE have been authorized by the Secretary of the Treasury, and the National Academy of Sciences, to publish the following important reports, which have not before been presented to the public:—

TREASURY DEPARTMENT,
WASHINGTON, D.C., June 9, 1875.

SIR,—Respectfully referring to the provisions of the act entitled "An Act to incorporate the National Academy of Sciences," approved March 3, 1868, I beg leave to submit herewith sundry samples, designated by marks and numbers in the accompanying schedule, of certain importations heretofore made at the port of New York.

The merchandise embraced in these importations is commercially known under the general designation of "calf-hair goods," and claimed by the importers to be wholly composed of cow or calf hair, cotton and vegetable fibre, without any admixture of wool.

It is claimed, on the other hand, by importers and manufacturers



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of wool, that the so-called calf-hair goods do, in fact, contain a certain percentage of wool, and cannot be made without it.

To enable the Department to determine the question thus presented, I have deemed it proper to avail myself of the provision contained in section three of the act above referred to.

I have, therefore, the honor to request that you will make, or cause to be made, such examination of the samples herewith submitted as is requisite for the purpose above specified; and to report the results thereof, in such form and with such details as may seem to you proper, at your earliest convenience.

It being possible that the results of such examination may be conclusive only as to the particular samples submitted, I will thank you to report, in addition, — so far as you may feel justified in so doing, — your views as to the practicability of manufacturing the class of goods in question without any admixture of wool.

It has been suggested to me, in behalf of the woollen manufacturers, and in support of their assertion that these goods contain wool, that in case of an examination, such as is now proposed being made, they would like to be represented by some scientist or expert of their own selection, who could, as they claim, afford information of a practical character which would be useful in the prosecution of such examination.

Whether to adopt this suggestion or not, I prefer to leave wholly to your discretion. Should you think proper to accept it, the Hon. William D. Kelly, of Philadelphia, will, on being notified of your conclusion, advise you further as to the person selected. I deem it but just, however, in that case, that the importers who are interested on the opposite side of the question should be represented, in like manner; and should the investigation hereby requested be delayed for the reason thus indicated, I will thank you to advise me promptly of such delay.

In view of the magnitude of the interests involved, and of the pressure upon the Department for a speedy determination of the question, a report at as early a date as may be practicable, consistently with the object to be accomplished, is very desirable.

I am, very respectfully,

B. H. BRISTOW, *Secretary*.

Professor JOSEPH HENRY,

President of the National Academy of Sciences, Washington, D.C.

SMITHSONIAN INSTITUTION, WASHINGTON, Sept. 18, 1875.
NATIONAL ACADEMY OF SCIENCES.

Hon. B. H. BRISTOW, Secretary of the Treasury.

SIR, — I have the honor herewith to transmit to you a report of a commission of the National Academy of Sciences, appointed at your request to examine the character of certain samples of "calf-hair goods," submitted by the Treasury Department.

Several gentlemen, members of the Academy, of reputation in connection with microscopic investigation, were at first selected to form this committee; but on account of ill health and previous engagements, but two were enabled to take charge of the work; viz., Dr. J. J. Woodward, of the Medical Department of the United States Army, and Dr. John L. Le Conte, of Philadelphia. These gentlemen were elected members of the National Academy on account of their contributions to original science, and have established a world-wide reputation. Without disparagement to others, I may truly say, that no authority in this country is more worthy of reliance in the line of microscopic investigations than these gentlemen.

The investigation proved a much more difficult and laborious work than might have been at first anticipated.

In the first place, a series of preliminary examinations were required to ascertain characteristics which might be relied upon with certainty, to discriminate between the different materials which might enter into the composition of the goods in question. This in itself was a difficult task. Secondly, the examination of ninety-three specimens, with the purpose of determining, at least approximately, the percentage of wool which they might contain, involved a large amount of labor, — too much to be expended in connection with the time at the disposal of the members of the Commission. They were, therefore, obliged to employ two experts to make the preliminary examinations, and to mount a series of specimens for the subsequent study of the Commission.

These preliminary investigations were made separately in Washington and in Philadelphia, but each on parts of the same samples, and the results compared; and these again verified by an independent examination by the Commission.

The report not only gives the character of each sample in regard to wool, but also a series of criteria by which this material can be discriminated in comparison with other articles which resemble it,



Heliotype.

A SINGLE FIBRE OF WOOL

Magnified 31

and which will be of use to other investigators to whom similar questions may be referred.

Accompanying the report are the remains of the samples from which the parts were taken for the two series submitted to examination, duly numbered to correspond with a descriptive list, with sundry papers designated in the annexed list.

I have the honor to be, very respectfully,

Your obedient servant,

JOSEPH HENRY,

President of National Academy of Sciences.

WASHINGTON, D.C., Sept. 17, 1876.

Professor JOSEPH HENRY,

President of the National Academy of Sciences, Washington, D.C.

SIR, — We herewith respectfully transmit our report, as the Commission of the National Academy of Sciences, appointed by you, at the request of the Honorable Secretary of the Treasury, to examine into the component parts of certain fabrics known in commerce as calf-hair goods.

In this report we have laid down certain principles intended to serve as a guide for the future examination of samples similar to those which we have examined. We would respectfully suggest that, in case the Department should desire the examination of such samples, the work may safely be confided to Drs. Hunt and Schaeffer, who were employed by us in making our preparations. We have every confidence in the integrity and ability of these gentlemen, and have had the opportunity to test their special knowledge of this subject.

It was our intention to have forwarded with this report the preparations referred to, and a few photographs representing the more important of the microscopical appearances described; but understanding the Department to desire our results as soon as possible, we have thought best to forward the report as soon as we were able to complete it, and will send the accompanying preparations and photographs in the course of a few days.

Very respectfully,

JOHN L. LE CONTE.

J. J. WOODWARD.

WASHINGTON, D.C., Sept. 17, 1876.

Professor JOSEPH HENRY,

President of the National Academy of Sciences, Washington, D.C.

SIR, — The Commission of the National Academy of Sciences, appointed by you at the request of the Honorable Secretary of the Treasury, to examine into the component parts of certain fabrics known in commerce as calf-hair goods, would respectfully report as follows:—

The scientific question raised by the letter of the Honorable Secretary is simply, Can the hair of the cow and calf be distinguished from wool? To answer this question in such a way as to serve as a guide for the examination hereafter of samples similar to those now submitted, has been the principal object of your Commission. After a careful study of the subject, we have arrived at the conclusion that the characters recognizable by the unaided senses cannot be relied upon to make the distinction with certainty. And that no such differences of composition exist as can be distinguished by any known chemical tests; but that the distinction can, in most instances, be made with certainty by means of the microscope, though it is not always possible to ascertain the percentage of cows' or calves' hair in mixed goods, for reasons which will presently be given.

In carrying on the investigations which have led to this conclusion, we have employed two experienced microscopists, — Dr. J. Gibbons Hunt, of Philadelphia, and Dr. E. M. Schæffer, of Washington, — who have made and submitted to us microscopical preparations of all the different samples, as well as preparations of different varieties of commercial wool, and of hair from a number of animals for comparison. We have based this report mainly upon the critical study of these preparations, which will be forwarded to you as soon as the weather permits a few photographs, representing some of the microscopical appearances described, to be made from them.

The term "wool," originally applied to the woolly hair of the sheep, as now employed in commerce, embraces also the woolly hair of various breeds of the goat, the camel, and the llama. All these animals, however, produce straight hair as well as wool; and, therefore, in strict propriety, their hair ought not to be spoken of as wool, unless it is more or less crispy, curled, or frizzled. Nevertheless, in the Revised Statutes of the United States (Government

Printing Office, 1875), p. 474, the "hair of the alpaca, goat, and other like animals," is embraced under the head of wool.

Moreover, it has been shown by Youatt ("Sheep: their Breeds, Management, and Diseases," London, 1837, pp. 56 and 93), that a variable quantity of wool is also to be found mixed with the straight hair of a number of animals besides those enumerated above, as in several species of deer, the hare, rabbit, beaver, otter, seal, lion, tiger, certain varieties of dog, and even some foreign breeds of oxen, as the yak of Tartary, and the ox of Hudson's Bay. The wool from these sources is structurally so similar to that from the sheep and goat, that the propriety of bestowing upon it the designation "wool" would seem to be unquestionable.

In attempting to discriminate the hair of the cow and calf from that of the sheep and other animals enumerated in the Statutes of the United States, it must not be forgotten that both kinds of hair are very similar in their general structure. In the first place, both are composed of a cortical substance, which is coated externally by a cuticle, and contains in its interior a medulla. In both, the cuticle is composed of a single layer of flattened scales, disposed in an imbricated fashion, overlapping each other like the shingles on a roof. The differences of these scales in size and shape in different hairs of the same animal, and even in different parts of the same hair, are so great that these characters cannot be relied on as a means of discrimination. So also in both, the cortical substance presents, under the microscope, a more or less distinct longitudinal striation, the optical expression of the firmly united spindle-shaped cells of which it is composed, and is the seat of the pigment, diffused or in granules, to which the hair owes its color. No constant peculiarities in these particulars characterize the two kinds of hair. In like manner, the medulla of both is composed of irregular polygonal cells, which often contain air. It is most abundant towards the root of the hair, while it often is altogether wanting for some distance from its point. The cells of this medulla differ too much in size and shape in different hairs of the same animal, and in different parts of the same hair, to afford by their characters the distinction sought for.

But notwithstanding this similarity of structure, most of the individual hairs of the cow and calf are so unlike the majority of those of the wool-bearing animals in their size and shape, that it might seem easy to make the distinction. They are much shorter, much thicker at their base, taper rapidly towards the point; the

medulla occupies a larger proportional part of the whole hair, and the free edges of the scales of the cuticle, which are so disposed as to form from twenty to forty imbrications to the $\frac{1}{100}$ th of an inch, lie quite smoothly upon the surface of the hairs, so that their contours, as seen under the microscope, closely approximate continuous lines. These characters are so well marked, that the coarser hairs of the cow and calf can readily be distinguished from the woolly hairs of any of the wool-bearing animals.

Unfortunately, in numbers, which vary with the breed, the individual, and the part of the body, there are also found in the cow and the calf many more slender hairs, which so closely resemble the shorter straight hairs of the wool-bearing animals, that it is often impossible to determine, by its appearance under the microscope, the animal from which a given hair is derived,—a circumstance which must at times prevent the microscopist from ascertaining the precise percentage of each kind of hair in an admixture of the two.

On the other hand, however, the majority of the woolly hairs of the sheep offer a combination of characters which are never found in the hairs of the cow and calf; namely, each of these hairs extends from half an inch to several inches in length without any medulla, and without perceptible taper. They present frequent but irregular intervals well-marked, one-sided, more or less spirally arranged thickenings of the cortical substance, which give to the wool its curly character. The mean diameter of each hair varies from $\frac{1}{100}$ th to the $\frac{1}{1000}$ th of an inch, or even less; and the scales of the cuticle are so arranged that their free edges project somewhat, forming well-marked imbrications, of which usually from fifteen to thirty can be counted in the $\frac{1}{100}$ th of an inch.

The percentage of wool estimated to be present in the samples of calves'-hair goods submitted to us for examination has been arrived at by estimating the number of fibres of these unmistakable characters in a small portion of the woof from each sample; and probably, therefore, understates, in some of the samples, at least, the actual admixture of hair from the wool-bearing animals. In a few of the samples in which such fibres of wool as have just been described were observed, the fibres were broken short, abraded, otherwise damaged, and had been dyed of various colors, justifying the opinion that they were not used for the first time, but were derived from the destruction of old woollen fabrics. In such cases the word "shoddy" has been inserted in the list,

with the distinct understanding, however, that we do not mean to assert that shoddy of better quality may not have been employed also in some of the other samples in which wool was found.

The fine hairs of the goat and kid, from the $\frac{1}{1000}$ th to the $\frac{1}{2000}$ th of an inch or less in diameter, also run from half an inch to an inch or more, without perceptible taper, without medulla, and are clothed with a cuticle resembling that of sheep's wool, but are almost, or altogether, devoid of the irregular thickenings of the cortical substance which characterizes the latter. Similar hairs are found in certain deer, and some other animals, but never on the cow or calf. They have been observed in considerable numbers in some of the samples, as will be seen by the appended list, but no attempt has been made to estimate the percentage.

The samples submitted to us for examination were all woven fabrics, in which the longitudinal threads, or warp, were composed wholly of vegetable fibre, and mainly of cotton; while the transverse threads, woof or filling, consisting of a loosely spun, lightly twisted thick thread, which, in most of the samples, was composed entirely of animal hairs; in a few samples only—which are specified in the appended list—a certain proportion of vegetable fibre, mainly cotton, was found also in the woof. In examining the samples to determine the presence of wool, it was, therefore, only necessary to examine the woof, and the percentage given in the appended list refer to the woof alone.

The dyestuff employed in manufacturing the goods rendered the hairs so opaque as to interfere considerably with the examination when no reagents were employed; but it was found that the action of dilute mineral acids decolorized the fibres to such an extent as to remove this obstacle without altering their texture. Glycerine proved to be the most convenient medium in which to mount the fibres for microscopical examination. For making these examinations, a good one-half or four-tenth inch objective was found most convenient; but lower powers were employed with advantage in estimating percentages, and higher powers in investigating individual fibres.

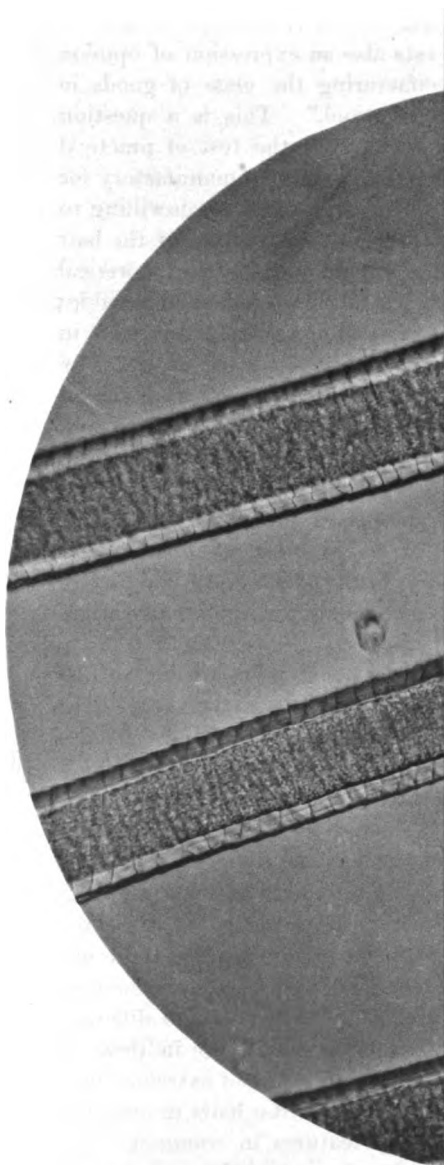
The appended list, in which the components found in each sample are stated, and an estimate of the percentage of wool given, was, in the first place, prepared by Dr. Schæffer, and subsequently agreed to by Dr. Hunt, who had independently examined the same samples. Your Commission, however, from their examina-

tion of the preparations made by these gentlemen, are convinced that the list is substantially correct.

The Honorable Secretary requests also an expression of opinion as to "the practicability of manufacturing the class of goods in question without any admixture of wool." This is a question which, we think, can only be answered by the test of practical trial; and unless we had at our disposal a suitable manufactory for the purpose of making the experiment, we should be unwilling to express an opinion. We see, however, in the structure of the hair of the cow and calf, as shown under the microscope, no theoretical reason why the manufacture of such a fabric should be impossible; and it will be observed that we were unable to detect any wool in several of the samples of the goods actually submitted to us. How these samples compare, in character, durability, and commercial value, with those in which a notable proportion of wool was observed, is a strictly commercial question, on which we express no opinion.

Before considering this report, it appears proper for us to refer briefly to the reports by Mr. Charles Stodder, of Boston, and Messrs. Torrey and Eaton, of New York, which were laid before us by the Treasury Department in connection with this investigation.

Mr. Stodder expresses the opinion that it is impossible to distinguish the hair of the cow and calf from that of the sheep. He indicates the points of agreement between the two kinds of hairs very much as we have done in this report, but the characters which may be employed to make the distinction sought escaped him. Messrs. Torrey and Eaton, on the other hand, believe that the desired distinction can be made by means of the microscope; yet they report that there is "no wool" in a number of the samples in which we find a considerable quantity. With regard to these discrepancies, we can only say that, while we do not in the least doubt the good faith of these gentlemen, — whose high personal character is well known to us, — the fact that they have come to different conclusions does not in the least shake our confidence in those at which we have arrived. The investigation is one of extreme labor and difficulty, and the microscopic images of the hairs in question are so complex, and possess so many features in common, that, without the guidance of the principles above laid down, it is easy to make mistakes.



Heliotype.

CAI
Magnified 3

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Lastly, it also appears proper for us to allude to the declaration of certain English manufacturers, which has been submitted to us by the Treasury Department, to the effect that the goods manufactured by them for exportation to the United States of America, under the designation of "calf-hair seals and calf-hair napped coating," are made "wholly of cow hair, calf hair, cotton and vegetable fibre, and contain no wool, worsted, or worsted-waste, either new or old, or shoddy." With regard to this declaration, we would say, that we have been unable to ascertain whether it refers to the samples in which we found wool, as well as to those in which we did not. Nor have we been able to learn whether the declaration in question represents the personal knowledge of the manufacturers, or whether it merely expresses their confident belief, based upon the representations of those from whom they purchased the calves' hair employed; for it seems not improbable, from the composition of some of the samples, that an incongruous mixture of a cheap kind, derived from various sources, — such as slaughter-houses, rag-bags, &c., — may sometimes be sold under the name of calves' hair.

But whatever explanation may be offered for this declaration, or for the statements of the various importers, — which last, however, for the most part, can only be based on hearsay evidence, — it is nevertheless true that a large number of the samples submitted to us do actually contain more or less wool, as is set forth in detail in the appended list.

All which is respectfully submitted.

JOHN L. LE CONTE.
J. J. WOODWARD.

PHILADELPHIA, PA., Aug. 28, 1875.

To the Commission on "Cow-hair" Goods, National Academy of Sciences.

GENTLEMEN, — In relation to the appended estimates of the proportion of wool in the samples of "cow-hair" goods given me for microscopical examination, I beg leave to state, —

1. The "warp," in all instances examined, was found to consist of cotton essentially, and, therefore, the examination discontinued. The subjoined estimates apply, therefore, only to the "woof," or "filling."

2. Under the term "wool" is included, primarily, the soft, more

or less curled, imbricated, hairs of all varieties of sheep; secondarily, the analogous, soft, imbricated hairs of some animals of the goat family (the Angora, Cashmere, Thibet goat, &c.), forming the inner downy coating of those animals. The distinction between the "wool" of the sheep and that of the goat is, as I understand, one not demanded of me in this connection.

3. The coarse, straight hairs forming the outer coat of the goat, and found in greater or less quantity, according to the modifying influence of climate, altitude, &c., are not included under "wool."

4. The inferior grades of sheep's wool also contain, as you are aware, a large proportion of these coarse hairs (see, especially, preparation No. 333, marked "Valparaiso wool," of the series submitted to the Commission, which is nearly all coarse fibres). To distinguish these from some of the coarse hairs from the calf is a matter requiring the most rigid scrutiny and considerable time; all these coarse hairs of sheep's wool are, therefore, omitted in the appended estimate.

5. In all instances where the wool, or some other ingredient, is mentioned alone, the remainder is understood to be mainly hair of the cow and calf, both which are included under "cow-hair."

6. Among the imbricated hairs of the wool of the sheep, some are occasionally found which closely resemble the softer hairs of the cow or calf,—so closely that I confess myself unable to discriminate between them in all instances (see preparations Nos. 310 and 327, marked "hair of cow, short," and "English cow-hair," respectively). Where I have found hairs of this description, I have marked them "doubtful," preferring not to include in the estimate of wool any hairs that cannot be substantiated as such.

7. The soft, inner hairs of the camel, vicuña, and flouaveo approximate in their general characteristics those from the finer breeds of goat, and some of them may have been included under "wool."

8. To estimate the relative percentages of hairs of the cow and flosse, coarse hairs from the sheep, &c., in each sample, would require a longer time than the Commission has given me for completing this report.

9. The approximate percentages of wool which I have marked against the several samples are, for the above-mentioned reasons, somewhat under the probable true percentages; but with the microscope it would, in my belief, be difficult to be more precise



Heliotype.

FIBRE OF CO
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without running the risk of including some of the similar hairs of other animals.

10. Having thus dwelt upon the difficulties attending the differential diagnosis of exceptional cases, I do not wish to be understood as having any doubt as to the true character of those fibres which I designate "wool." They are unmistakably wool, and I am willing to be put to any fair test to prove that I know wool when I see it.

Very respectfully,

Your obedient servant,

E. M. SCHAEFFER, M.D.

Five per cent and under.

Number.

- 8. This specimen, besides much cow-hair, contains so many "doubtful" hairs, and so few characteristic wool fibres, that it is possible it has been made without any intentional admixture of sheep's wool.
- 4. Very similar to above.
- 21. Cow-hair. Some fibres of wool.
- 84. Certainly five per cent wool, probably more.
- 86.
- 88.
- 85.
- 76.

Five to ten per cent.

- 75. } Coarse sheep and goats' hair, much broken.
- 78. }
- 77. }
- 79. }
- 80. Small amount of fine wool.
- 81. Kid hair seen (coarse).
- 83. Fine hair from kid.
- 87. Small amount of cotton.
- 89.
- 90. Sheep's wool, very evident.
- 92. Considerable number of "doubtful" hairs, but at least five to ten per cent wool.
- 91.
- 98. } Long wool from common sheep, very plain.
- 22. }
- 23. Very similar to 22.
- 24. At least ten per cent true wool; many doubtful hairs.
- 25. Accidental wood fibre.
- 26.
- 27.

Nos. 24-27, inclusive, are almost identical in all principal characteristics.

80.

Twenty to forty per cent.

- 1. This specimen is at least half cotton; and of the wool, the greater part is "waste," or "shoddy," as shown by the extreme shortness, various colors (when not removed by the reagents employed to decolorize it), and generally frayed and battered appearance. It would be difficult to find, on careful search, as much as five per cent of genuine cow-hair in the entire sample.

482 NATIONAL ASSOCIATION OF WOOL MANUFACTURERS.

- Number.
2. At least forty per cent wool. Some cotton. An admirable specimen to contrast the fibres of true wool with those from cow-hair, which most nearly approximate them. Shoddy.
46. }
47. }
48. } Quite similar. Coarse cow-hair; coarse wool and sheep-hair; few
49. } doubtful fibres; many scales and fragments of hair.
50. }
- Fifty per cent and over.*
7. Undoubted wool in very large proportion. Very little shoddy, if any.
9. }
10. }
11. } Very similar to 7.
12. }
13. }
14. }
15. }
16. } Resembles 7.
17. }
18. }
- Per cent not determined.*
82. Mostly cow-hair. Coarse sheep-hair.
5. Contains shoddy and a little cotton. Many "doubtful" hairs.
6. Very similar to 5, but more true wool. A little cotton; and bast fibres from some undetermined plant, probably accidental.
51. }
52. }
53. } Not much wool in any of these.
54. }
55. }
56. } Small amount of fine kid-hair.
57. }
58. }
59. } Some coarse wool in these.
60. }
61. }
62. } Large number of doubtful hairs.
63. }
64. } Contain a number of long narrow hairs, sometimes pigment gran-
65. } ules. They cannot be ascribed to any one animal with certainty,
66. } but are in all probability from the kid.
67. }
68. } Large amount of kid hairs.
69. }
70. }
71. } Very similar to 64.
72. }
73. }
74. }
8. Large amount of wool. Not sufficiently decolorized.
19. } Large amount of wool. Some doubtful hairs.
20. }
28. } Some true wool. Would not like to give per cent, without longer
29. } time for comparison with test series.
31. }
32. }
33. }
34. } Much fine hair and wool.
35. }
36. }
37. }

Number.

41.	} Not much wool. Many doubtful hairs.
42.	
43.	
44.	
45.	
38.	
39.	
40.	

E. M. SHAEFFER, M.D.

The above report is entirely correct, and has my full unity.

J. G. HUNT, M.D.

TREASURY DEPARTMENT, Oct. 19, 1875.

COLLECTOR OF CUSTOMS, New York.

SIR, — Referring to previous correspondence concerning the proper classification of so-called calf-hair goods, I have to state the conclusions reached by the Department after a thorough examination of the subject.

The same question was before the Department in June, 1870, with reference to several varieties of goods composed of mixed materials, but alleged to contain no wool. The conclusion then reached is sufficiently set forth in the certificate which the Department adopted at that time, and published in the Synopsis for 1870, in the following form, the instructions governing the use thereof being also given:—

CERTIFICATE.

“ It is hereby certified, that all of the goods described in the accompanying invoices, of the value of £——, delivered to ——, for shipment, to the port of ——, in the United States, per ship ——, were manufactured by the undersigned in his works at ——: that they are all made wholly of cow hair, calf hair, cotton, and vegetable fibres, and contain no wool or worsted, or wool or worsted waste, either new or old, or shoddy.

“ This certificate, duly sworn to before an officer competent to administer oaths, whose capacity to act is attested by a United States consul, should be attached to the invoice to which it refers by seal and ribbon, may be accepted as proof of the character of the goods, and upon production of such certificate they may be classified as manufactures of hair and cotton, dutiable at thirty-five per cent *ad valorem*, unless by an examination of the goods such certificate is shown to be false.”

Under this certificate, it appears, all the varieties of so-called calf-hair goods have from June, 1870, down to February, 1875, in the majority of cases, been admitted as manufactures of hair, &c.,

at the rate of thirty-five per cent *ad valorem*, thus relieving them from the specific duty of fifty cents per pound, in addition to the *ad valorem* rate, to which, as manufacturers in part of wool, they had theretofore been subject.

In February last, on a trial of the case of Hermann et al. v. Arthur, at New York, brought to recover an alleged excess of duties on certain goods alleged to be manufactures of cow or calf hair without any admixture of wool, the question of fact necessarily came up, and the evidence adduced on the part of the Government tended very strongly to show that the class of merchandise generally known as calf-hair goods could not be manufactured without some admixture of wool or woollen material. The attention of the Department was immediately drawn by the United States Attorney to the facts thus apparently developed, which, if confirmed, would show that the Government had for a series of years been deprived of a large proportion of its lawful dues, the difference on the importations represented in said suit alone amounting to upwards of \$11,000.

Under these circumstances, the Department at once instructed you, by letter of February 12, to suspend action upon all pending importations of the class referred to, and to permit no adjustments at the previous rate of duty, until further advised.

Investigations were then set on foot to determine, by proper tests, and with certainty, the character of the goods in question. The results thus obtained not being deemed conclusive, the Secretary of the Treasury, in June last, submitted the question, with samples, to the National Academy of Sciences, under the provisions of the third section of the act of March 3, 1863, incorporating that institution, which makes it the duty of the Academy, "when-ever called upon by any department of the Government, to investigate, examine, experiment, and report upon any subject of science or art," but without any compensation other than the payment of actual expenses.

The report of Professor Joseph Henry, President of the Academy, has recently been received, transmitting the reports and sub-reports of the Commission, consisting of members of the Academy appointed to conduct the investigation, together with the samples, preparations, and illustrations used and made in the course thereof.

From these reports it appears that ninety-three different samples of calf-hair goods were examined, specimens from each being

separately mounted and tested by Dr. E. M. Schaeffer, in Washington, and Dr. J. G. Hunt, in Philadelphia (experts of high repute, expressly employed for the purpose by the Commission), and that the results thus separately obtained, being first compared and found to substantially agree, were again verified by an independent examination by the Commission. It is proper to remark, in this connection, that the experts alluded to made and submitted to the Commission microscopical preparations not only of all the different samples furnished by this Department, but also, for the purposes of comparison of different varieties of commercial wool and of hair from a number of animals.

The results thus obtained are certified in a report signed by the two acting members of the Commission; namely, Dr. J. J. Woodward, of the Medical Department of the United States Army, and Dr. John L. Le Conte, of Philadelphia, of whom President Henry speaks in his report as follows: "These gentlemen were elected members of the National Academy on account of their contributions to original science, and have established a world-wide reputation. Without disparagement to others, I may truly say that no authority in this country is more worthy of reliance in the line of microscopic investigation than these gentlemen."

The results thus obtained and certified may be summarized as follows:—

Of the ninety-three samples examined, eight contain five per cent or less of wool; twenty contain from five to ten per cent; seven contain from twenty to forty per cent; eleven contain fifty per cent or over; while in the remaining forty-seven samples the actual presence of wool, as a component material, is ascertained, the percentage not being determined.

Under these circumstances the Department has arrived at the following general conclusions, which, upon mature consideration, I deem fully warranted by the premises, and you will be governed accordingly:—

First. That the manufacturer's certificate authorized in June, 1870, as sufficient evidence that the goods therein referred to are "manufactures of calf or cow hair, cotton and vegetable fibre, without any admixture of wool or worsted, or wool or worsted waste, either new or old, or shoddy," can no longer be accepted as conclusive, and will be disregarded, not only as to future importations of similar goods, but as to all importations, action on which was suspended by Department's instructions of Feb. 12, 1875.

Second. In determining the classification of the several varieties of merchandise hereafter imported under the commercial designation of calf or cow hair goods, customs experts will be governed by the same general rules or principles under which such classification was fixed prior to the promulgation in June, 1870, of the certificate and instructions above cited.

Third. The rule last above stated will also apply to all importations of a like character heretofore made and remaining in the custody of the Collector.

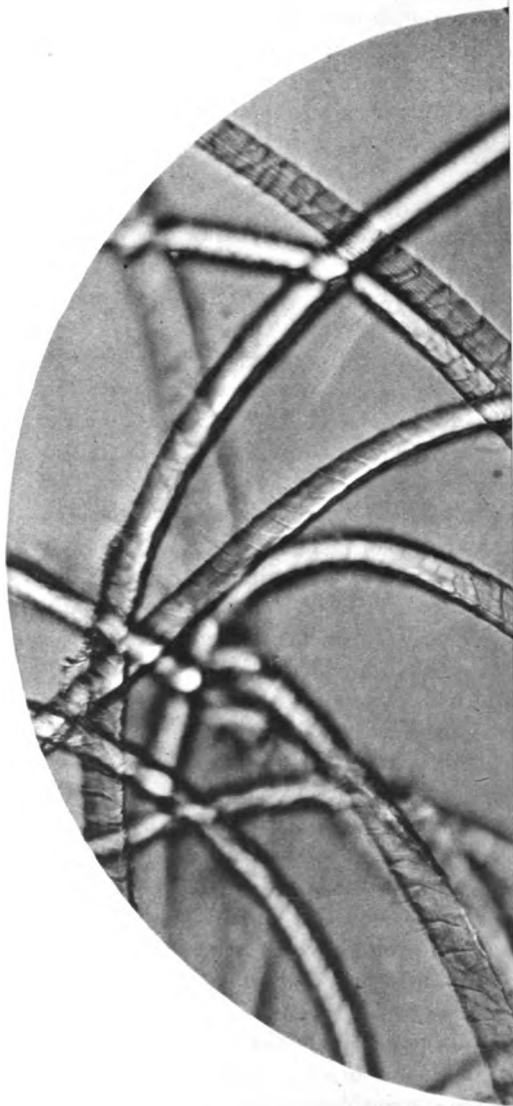
Fourth. With reference to importations of like character remaining in warehouse, or withdrawn upon entries not finally liquidated, such liquidation will, so far as practicable, be based upon an assessment of duties at the rates properly appertaining to manufactures in part of wool, not otherwise provided for.

Fifth. With reference to liquidated withdrawal entries covering goods of the class in question, the Department reserves the right of reliquidation; and, where a balance appears due from the importer, of proceeding for a recovery of the same.

The appeals now pending in the Department on assessments of duty at wool rates on so-called calf-hair goods will be disposed of by specific instructions, and you will at any time apply to the Department for further instructions in the premises on any points which, on a further consideration of the subject, either in the light of this letter or otherwise, you may deem proper to call to the attention of the Department.

In view of the delay which has attended the action of the Department, as well as of the importance of the results which were to be determined in connection with importations of the character referred to, I deem it proper to say that such action has from the beginning been dictated solely by the desire of this Department to ascertain beyond cavil the facts necessary to a final conclusion. One of the results of this course, it was hoped, would be to satisfy importers that the careful, deliberate, and thorough processes, and the unbiassed sources from and through which a conclusion might thus be reached, would justify them in accepting it as final, thereby avoiding the expense and delay of litigation.

I deem it proper to remark further, in justice both to importers of the class of goods referred to, as a body, and to the experts in the customs service who have heretofore been charged with the duty of examining such goods, that the investigation made under the auspices of the Academy of Sciences has shown the extreme



Heliotype.

WOOL OF M
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difficulty, and, in some instances, the impracticability, of determining, by any of the ordinary modes of inspection or examination, the fact whether wool in any form was actually present or absent in the fabrics thus imported and examined.

The Department is hence prepared to believe that in many instances importers have been deceived with reference to the actual character of such goods; and that, depending upon the certificates furnished by the manufacturers, they have, in good faith, imported and entered them as goods wholly free from any admixture of wool.

This, however, cannot relieve such importers from the legal consequences of their importations, nor the Department from its plain duty of administering the law applicable thereto.

You are further informed that, in pursuance of the general line of policy indicated in the present communication, importers of so-called calf-hair goods, which they believe to be wholly free from any admixture of wool, but which, under the instructions herein given, are differently classified, may elect either to pay, under protest, the duties consequently imposed thereon, or, in advance of any payment of duties, to have a scientific analysis of samples made by experts designated by the National Academy of Sciences, or selected by the importers, with the concurrence of this Department, but this privilege will not, of course, apply to importations covered by the samples already examined, as hereinbefore set forth.

I am, very respectfully,

B. H. BRISTOW, *Secretary*.

No better illustration could be given of the extraordinary care bestowed by the Treasury Department upon this question, than the following despatch and letter, received, unfortunately, after the above reports were in print, and contracts completed for heliotyping the photographs. The question of duty on this class of goods would seem not yet to be finally settled, although the scientific information is a positive gain to our industry:—

WASHINGTON, Dec. 12, 1875.

JOHN L. HAYES, Esq., &c.

Delay publication in "Bulletin" of reports furnished. Advices by mail.

CHAS. F. CONANT.

TREASURY DEPARTMENT,
WASHINGTON, D. C., December 21, 1875.

JOHN L. HAYES, Esq., Secretary, &c.,
11 Pemberton Square, Boston, Mass.

SIR,—The Department sent you a telegraphic despatch, of this date, as follows: "Delay publication in 'Bulletin' of reports furnished. Advices by mail," which despatch related to the proposed publication, in the "Bulletin" published quarterly by your Association, of certain reports relating to so-called calf-hair goods transmitted to you under date of the 4th inst.

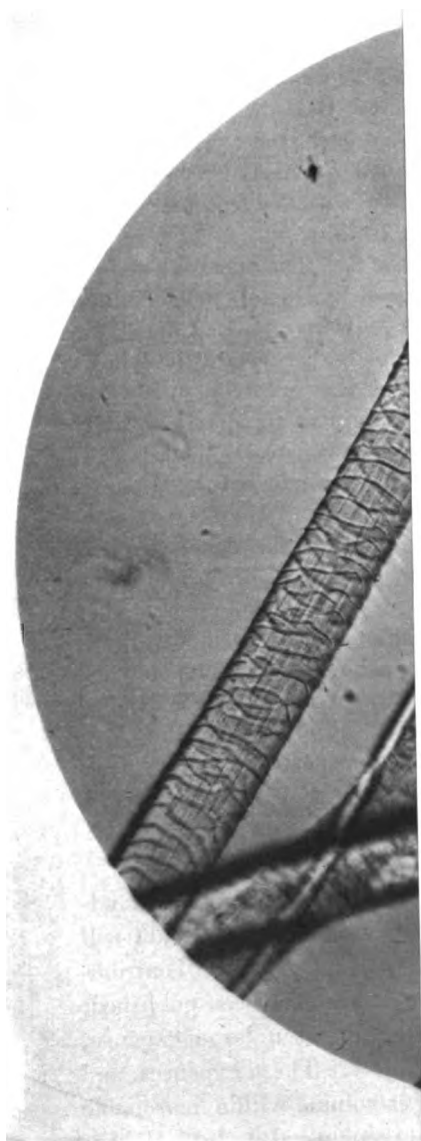
Said despatch was occasioned by the fact that there is an apparent discrepancy between the report made by Doctors Schaeffer and Hunt and that made by Doctors Woodward and Le Conte; the latter containing, as you may have already discovered, the following statement: "It will be observed that we were unable to detect any wool in several of the samples of the goods actually submitted to us," whereas the Department construed the report of Doctors Schaeffer and Hunt, which was indorsed by Doctors Woodward and Le Conte, as meaning that all the samples submitted did, in fact, contain wool. This was the conclusion expressly stated in Department's letter to the Collector at New York, dated the 19th of October last, and which, upon further investigation will, it is believed, be found to have been correct.

The Department will take steps to have said discrepancy explained, and will advise you of the result. Until then it is deemed best that the reports should not appear in print.

I am, very respectfully,

CHAS. F. CONANT.

The report of the National Academy of Sciences, notwithstanding the discrepancies referred to, which we have no doubt will be reconciled, furnishes the most important scientific contribution to the natural history of wool that has ever been published. We have accordingly made illustrations, at a large expense, justified by the importance of the subject. These expenses, and the necessity of bringing the present volume within reasonable compass, have compelled us to omit our usual Industrial Miscellany.



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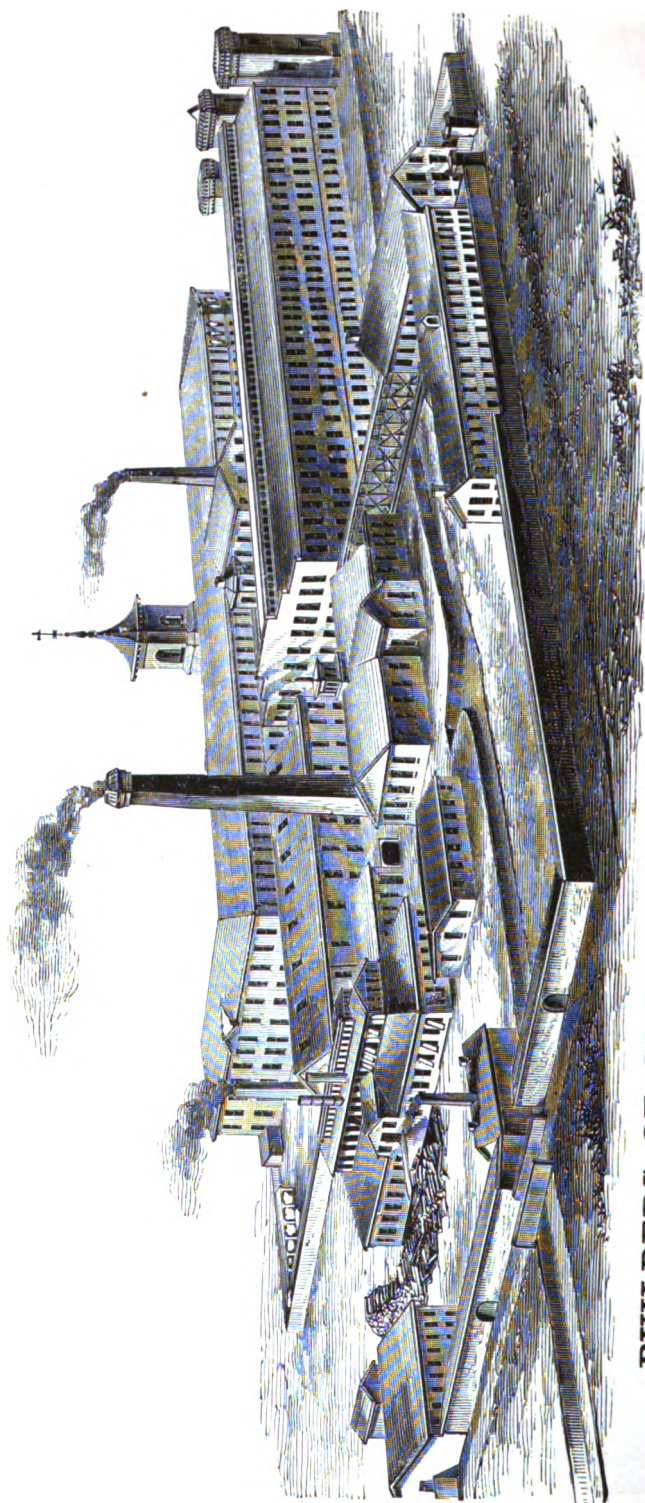
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- II.**
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- III.**
REPORT OF THE PROCEEDINGS OF THE CONVENTION OF DELEGATES from the National Association of Wool Manufacturers, and from the several Organizations of the Wool-growers of the United States, at Syracuse, N. Y., Dec. 13, 1866. 99 pp.
- IV.**
JOINT REPORT OF THE EXECUTIVE COMMITTEE of the National Association of Wool Manufacturers, and of the Executive Committee of the National Wool-Growers' Association, addressed to the United States Revenue Commission, Feb. 9, 1866. 22 pp.
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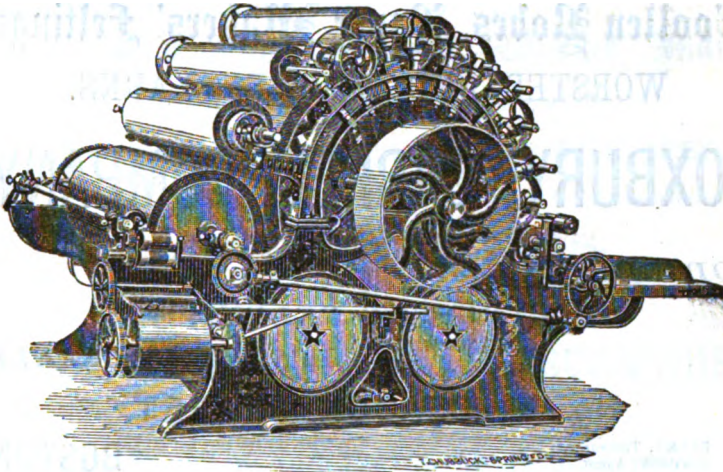
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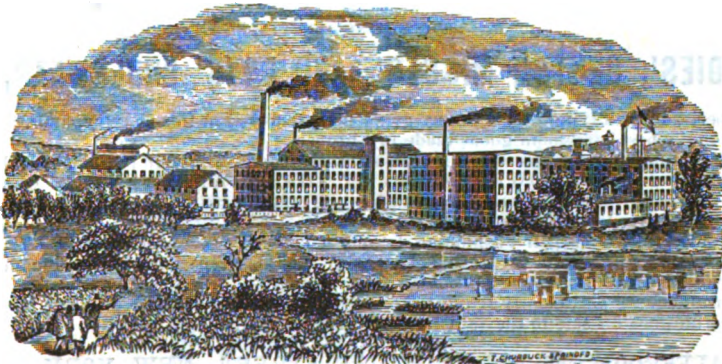
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Consumers are particularly requested to notice the quality of these goods in their use. Full lines for sale to the jobbing trade only, at their

SALESROOM, 55 and 57 WHITE STREET, NEW YORK.

H. J. LIBBY & CO., Agents.

BEACH & COMPANY, COMMISSION MERCHANTS,

HARTFORD, CONN.,

Importers of

Cochineal, Gudgeon, Alizarine, Madder, Indigo,

And other Dyestuffs. Sole United States Agents for

MESSRS. BROOKE, SIMPSON, & SPILLER, ATLAS WORKS, LONDON,

The largest and best appointed establishment in the world for the manufacture of

ANILINE DYES.

Having reliable and experienced Correspondents in Europe and Australia,
are prepared to import

WOOL AND GENERAL MERCHANDISE

To order, upon the most favorable terms.

To Woollen and Cotton Manufacturers.

WARRANTED INDIGO BLUE.

New Process for Dyeing Wool, Cloth, and Yarn, with Indigo, producing a Fast Color with our

PATENT INDIGO BLUE DYE.

Can produce any shade of Blue, from the deepest army to very lightest tint, all from same vat in one day; can't lose a vat.

SOUTH ROYALSTON, Jan. 15, 1875.

Messrs. Jerome Marble & Co.,—Gentlemen: We take pleasure in saying that, having used your "Patent Indigo Blue Dye" for the last three months, it has given us entire satisfaction, fully equal in color and quite as cheap as our Wood Vat, besides being able to do a very much larger amount of work per day than by the old process, and I would cheerfully recommend it to manufacturers using Indigo.

Respectfully yours,

R. R. SAFFORD, Superintendent Royalston Woollen Mills.

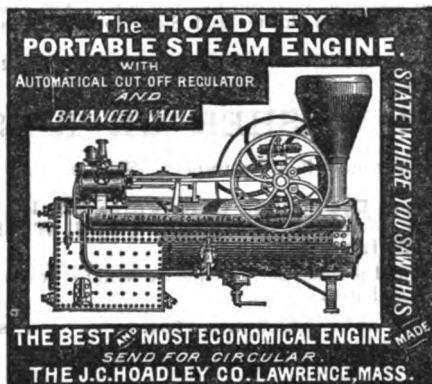
I fully indorse all my Superintendent has said in regard to the Patent Indigo Blue Dye.

GEO. WHITNEY.

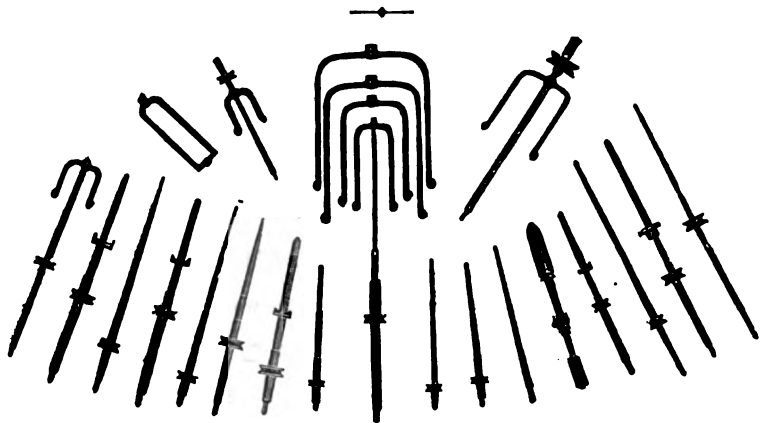
The Royalston Woollen Mills make a specialty of dark blues for coatings and military goods.
For further particulars and testimonials, address

JEROME MARBLE & CO., Worcester, Mass.

All parties infringing on our rights will be dealt with according to law. Look out for Imitations.



ESTABLISHED 1836.



A. HOPKINS & CO.,
Spindle Makers & Machinists,
PASCOAG, R.I.,

Manufacturers of ALL KINDS of Cotton, Woollen, Silk, and Linen.

**Spindles, Flyers, Steps, Bolsters, Caps, Tubes, Whirrs,
 Collars, Skewers, Race Rod, &c.. &c.**

Especial attention given to the manufacture of

MULE SPINDLES AND LIGHT FRAME SPINDLES

From best Refined Steel.

We give particular attention to repairing Spindles, Flyers, &c., of all kinds. We also apply the Patent Automatic Bolster and Step Holder; all getting loose in the rail absolutely avoided.

We manufacture as a specialty the Improved Rotary Fulling Mills, and A. S. Hopkins's Patent

CLOTH WASHER OR RINSE,

Warranted superior to any other in every respect. Sold on trial. *Send for Testimonials.*

We also manufacture Dye Tubs, Blue Vats, Tanks, Cloth Cases, Boxes, &c., of every description. Also, Fulling Mill, Washer, Card and other Rolls, and Cylinders.

Send for Catalogue and prices. Correspondence with parties in want of any thing in our line respectfully solicited.

H. L. HOPKINS.

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Established 1840.

BANDING A SPECIALTY. THE TRADE SUPPLIED.

H. A. BRIGGS & CO.,

Sole Manufacturers of the

Celebrated Anthony Banding.

THE STANDARD FOR COTTON AND WOOLLEN MACHINERY.

A large assortment constantly on hand. Cotton Ropes, Clothes Lines, Sash Cords of any size, length, twist, or weight. Also, Cotton Yarns, Batts, &c. And dealers in all kinds of Cotton Waste, Paper, Paper Stock, and Manufacturers' Supplies. Commission Merchants and Manufacturers' Agents.

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MANUFACTURERS OF

Machinery for Opening and Ginning Seed Cotton; Machinery for Preparing and Spinning Cotton, Wool, and Worsted; Machinery for Carding and Spinning Silk Waste; Power Looms for all descriptions of Plain and Fancy Cloths in Cotton or Wool; Improved Slasher Sizing Machines; Dressing, Warming, Beaming, Winding, and Reeling Machinery; Cloth Folding and Measuring Machines; Hydraulic and Cam Bundling Presses for Cloth; Combing Machines for Cotton; Combing Machines for Wool; Crighton's Patent Opening Machines for Cotton; Hard Waste Breaking up Machinery; Patent Burring Machines for Wool; Self-Acting Mules for Cotton, Wool, and Silk Waste, &c., &c.

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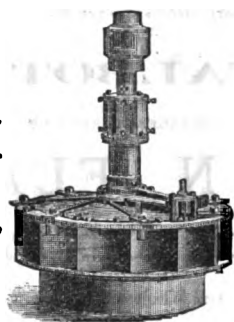
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THE ANGELL WATER WHEEL,

EQUAL TO ANY IN THE COUNTRY.

At either full or partial gate, it has no superior.

It gives steady power, and is economical.



Strength, durability, tight gates, no want of new steps, high speed, and easy working gates are among its leading features.

EVERY WHEEL WARRANTED.

Built by the Angell Water Wheel Co., Providence, R.I.

SEND FOR A CIRCULAR.

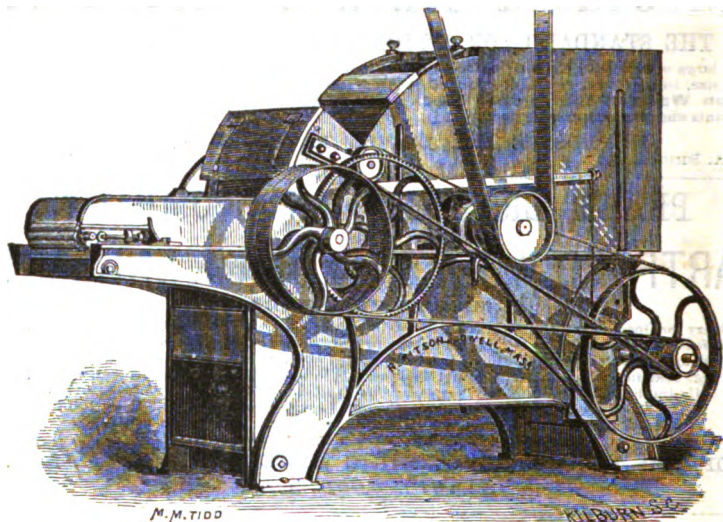
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BUILDERS OF PATENT COTTON OPENERS AND LAPPERS.

With recent Valuable Improvements, Patent Compound Opener Lapper, Shoddy and Waste Machines, and Rag Dusters, Needle-Pointed Card Clothing.

**KITSON'S PATENT RAG AND WASTE PICKER,**

With Improved Bonnet and Bit Extractor,

For picking Cotton or Woollen Waste, Rags, &c., making a Superior Shoddy. The frame is of Iron, and rests firmly on the floor. The Cylinder is strongly built, being double hooped at each end.

The pins are imported, and are made by an experienced pin maker from the best of Steel. The rags are well seasoned and not liable to split, or the pins to get loose. The feed rolls are made from the best Steel, and are geared independently of each other, and consequently they are not liable to slip. Capacity, 500 to 800 lbs. of ordinary woollen rags per day.

C. P. TALBOT & CO.,

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For Beavers, Cassimeres, Jeans, Yarns, &c.,

Use the best substitute for Wool.

WOOL EXTRACT.

I make the best in the United States. Also,

WOOL SHODDIES

Of the better kind, and

GRADED WOOLLEN RAGS

Of all descriptions for Shoddy Manufacturers. Send for samples.
Correspondence solicited.

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PATENT INSIDE BOLT WORK.

**More secure from Burglars, and no expense repairing
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Champion Record in the Great Boston Fire.

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DRESS SILKS, BLACK, COLORED, AND STRIPED GROS GRAIN.

PARASOL SILKS, IN ALL SHADES AND WIDTHS.

MARCELINE AND FLORENTINES.

**FOULARDS, ALL COLORS AND GRADES, FOR HAT, CAP, AND
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BLACK AND COLORED GROS GRAIN RIBBONS.

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**TRAMS, ORGANZINES, AND FINE PATENT SPUN SILKS FOR
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SILKS FOR SPECIAL PURPOSES, TO ORDER.

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Steam and Gas Pipe Company,
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DEALERS IN
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Manufacturers of every description of Steam and Gas Fittings.

STEAM HEATING MANUFACTORIES A SPECIALTY.

SPRINKLING PIPE,

For Extinguishing Fires in Manufactories.

We have made extensive experiments to ascertain the proper method of arranging Sprinkling Pipe.

We can put up Wrought Iron Pipe as **cheap or cheaper** than the price charged for sheet-iron pipe, which has been shown to be of insufficient strength for the purpose. *Send for particulars.*

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FOR LIGHTING MANUFACTORIES.

We are lighting upwards of one hundred first-class Manufactories at an average cost less than one dollar a burner a year, when running full time.

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MANUFACTURERS OF

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C. F. FAIRBANKS, Treasurer,
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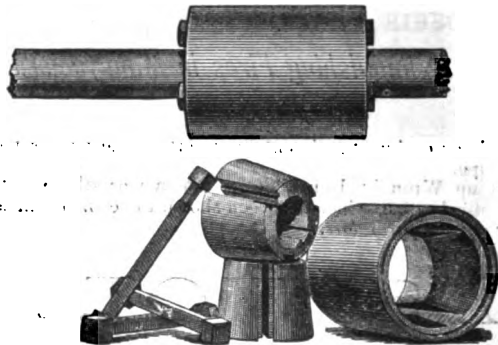
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For 28 years we have been engaged in perfecting a system for the Transmission of Power, and we can now offer a well constructed, easy-running line. We make every thing requisite in the construction of **SHAFTING**. We make tender for the whole work, erected ready for the belts, and for *gross sum*, and invite correspondence.

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EXTRA THREE PLYS,

IMPERIAL PLYS,

SUPERFINE,

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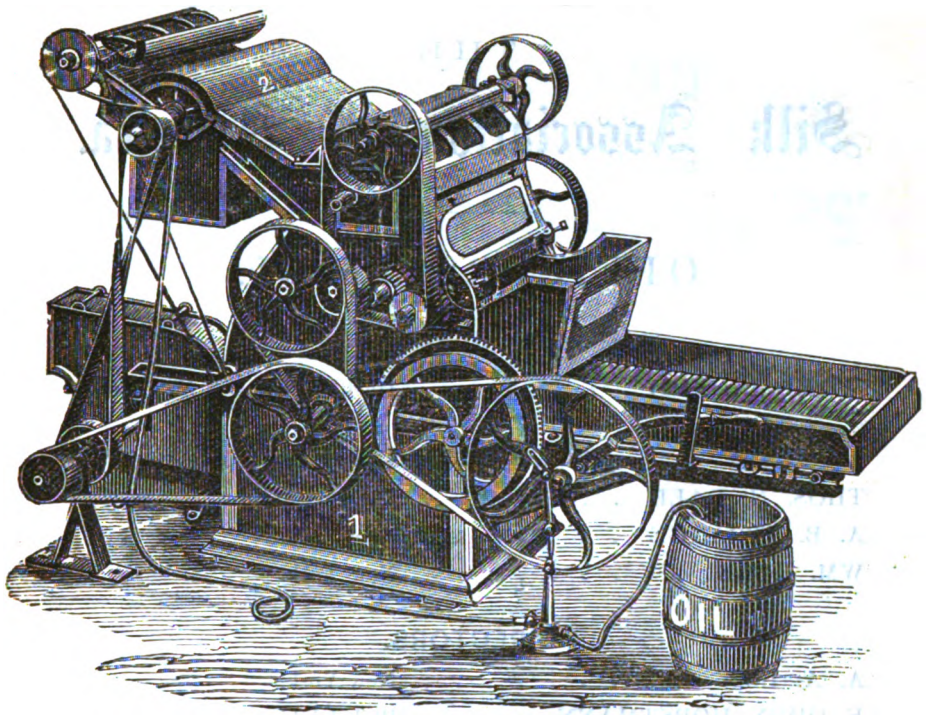
The works of this Company are conducted under the direct personal supervision of the inventor of the "Corliss Engine," and are

THE ONLY WORKS

Where the most perfect type of this Engine can be obtained.

GEORGE H. CORLISS, Treasurer.

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PARKHURST'S PATENT DOUBLE CYLINDER BURRING PICKERS,

For Picking, Burring, and Dusting all grades and qualities of Wool. Recent improvements, including a beater attached to the spout, for the purpose of more thoroughly mixing and cleaning the wool; attached to this is an improved Oiler, for the purpose of oiling the wool. Wool running once through the Picker is dusted, burred, and picked, ready for the cards, making a saving of labor and power; the wool is prepared better, and is more evenly oiled and picked, than by any other process in use. (See No. 2.)

No. 3.

PATENT STEEL-RING DOUBLE BURRING MACHINES,

With patent Steel-ring Feed Rollers, applied to Carding Machines.

No. 4.

STEEL-RING SINGLE BURRING MACHINES,

Applied to First Breakers of Carding Machines.

FINE STEEL-RING BURRING MACHINES,

Applied to Second Breakers and Finishers of Carding Machines.

No. 5.

PATENT STEEL-RING FEED ROLLERS,

Applied to Single Burring Machines, Second Breakers and Finishers of Carding Machines. Patents granted June 17, 1862, March 13, 1865, July 24, 1866, January 11, 1870.

STEEL-RING WASTE CARD.

(Double and Single) for all kinds of hard and soft twisted Yarns worked up. Superior to all other Machines now in use, and for about half the price of the imported ones.

Re-clothing, Grinding, and Filing parts of Machines, Castings, &c.,

Promptly attended to and furnished on short notice.

All Machines guaranteed to give perfect satisfaction. Thirty days' trial allowed.

Works, Corner of Cross and Spring Streets, Newark, N.J.

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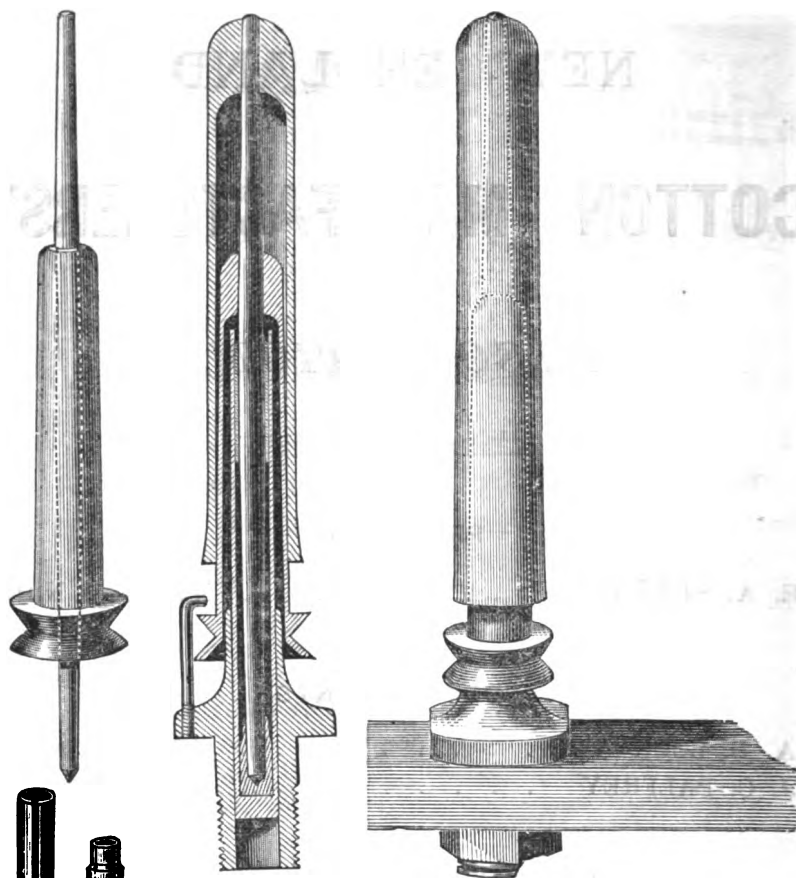
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Rabbeth & Atwood's Patent Self-Oiling Spindles,
FOR LIGHT WORK.

FALES, JENKS, AND SONS,

MANUFACTURERS OF

COTTON MACHINERY;

Also, Shafting and Hangers, with Self-Lubricating Boxes, Rotary
Force Pumps, Plunge Pumps;

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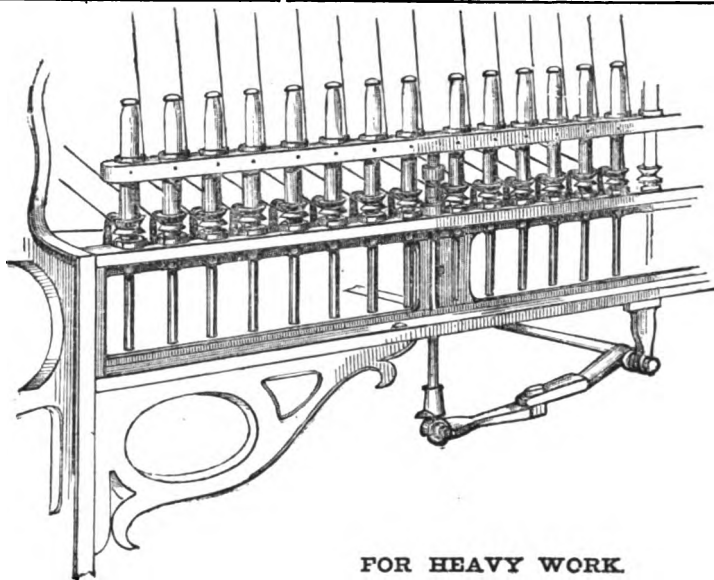
Hydrants and Discharge Pipes,

C. A. HOUSTON'S TURBINE WATER WHEEL.

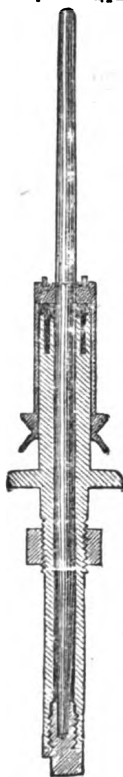
Cast Iron Water and Steam Pipe constantly on hand. Foundry Work done to order.

PAWTUCKET, R.I.

[SEE OPPOSITE PAGE.]



FOR HEAVY WORK.



Rabbeth & Atwood's Patent Self-Oiling Spindle.

Patented Dec. 18, 1860; Aug. 25, 1866; April 2, 1867.

This Spindle has now been in operation over six years, and has proved to be durable. There are now in operation over 250,000, large and small, in lots of from 25,000 down to single frames. They are giving general satisfaction.

The advantages claimed for this Spindle over all others are, —

1st. That it does not require oiling oftener than from twice to eight times a year. As it is arranged, the Spindle actually runs in oil, while that oil is perfectly protected from light, dust, and air.

2d. It does not throw off oil, thereby saving much oil and labor in keeping the frames and floors clean.

3d. It is more durable, being thoroughly oiled and the bearings perfectly protected from dust and grit.

4th. If for ring-spinning, it simplifies the frames very much, and avoids the necessity of using adjustable rings, as this spindle is perfectly adjustable to the ring.

5th. A much simpler and cheaper Bobbin is required than can be used on any other of the various improved Spindles.

6th. There is no possibility of slack twist from bobbins slipping on spindle. This spindle holds the bobbin more securely than any other taper top spindle ever made.

A comparative test of power, had at the PACIFIC MILLS, Lawrence, Mass., Oct. 1, 1873, showed the following results: —

Maker of Frame.	Kind of Spindle.	Size of Ring	No. of Yarn.	Rev. per min.		Av. of Power.		Spindles per H.P.
				Front Roll.	Spindle.	Whole Frame.	Per Spindle.	
Lowell Mach. Shop	Rabbeth	1½ in.	28	73	6059	1.186	3.90	141
J. C. Whitin's . . .	Sawyer	1½ in.	28	73	6059	1.377	4.74	116
" " . . .	Pearl	1½ in.	23	73	6059	1.483	5.10	107

The above tests were conducted by SAMUEL WEBBER, C. E., of Manchester, N. H. Great pains were taken to have the conditions as near alike as possible on all the frames tested. The result may be relied upon, as showing a fair and impartial comparison. Over the common spindle doing the same amount of work, this spindle is guaranteed to save from 33 to 50 per cent in power.

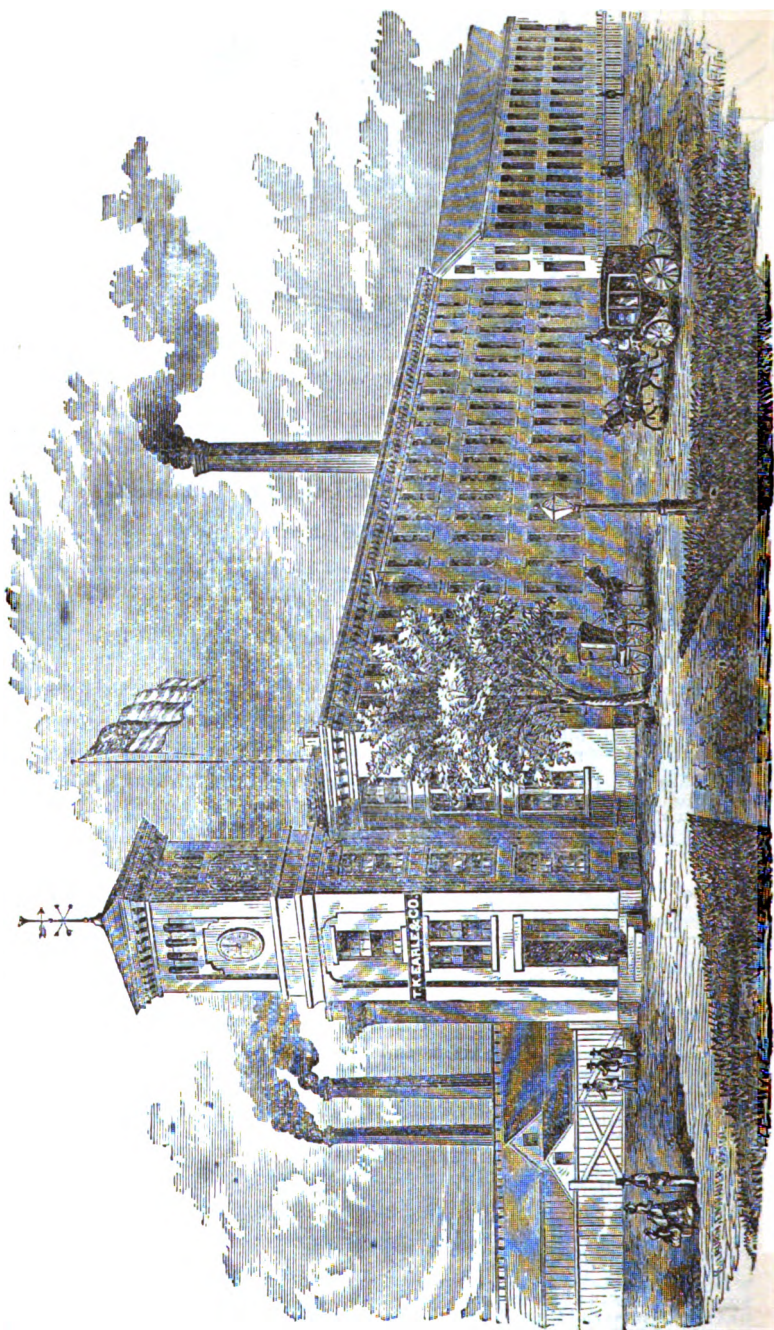
Numerous testimonials might be given, but we prefer to give a simple reference to parties who are using them in large numbers, and where they may be seen in operation.

REFERENCES.		In operation.	Ordered.
Messrs. J. & P. COATES, Scotland		54,500	15,000
" CHERRY BROS., Hartford, Conn.		15,000	
" ATWOOD MACHINE CO., Willimantic, Conn.		16,000	
" A. & W. SPRAGUE MANUFACTURING CO., R.I.		21,000	
" POTOMSKA MILLS, New Bedford, Mass.		21,000	
" PACIFIC MILLS, Lawrence, Mass.		24,000	
" CONANT THREAD CO., Pawtucket		25,000	25,000
" WAMSUTTA MILLS, New Bedford, Mass.		37,000	25,000
" SHOVE MILLS, Fall River, Mass.		15,360	2,560
" GRANITE MILLS, Fall River, Mass.		15,360	2,880
" NAUMKEAG STEAM COTTON CO., Salem, Mass.		10,000	
" BERKELEY MILL, Londale, R.I.		4,000	
" UTICA STEAM COTTON CO., Utica, N.Y.		7,000	
" WALCOTT & CAMPBELL, New York Mills, N.Y.		7,016	

Parties about to contract for new machinery, or make repairs on the old, will find it greatly to their advantage to use these spindles. For further information regarding the RABBETH SPINDLE, please address

FALES, JENKS, & SONS, Pawtucket, R.I.

T. K. EARLE AND COMPANY, WORCESTER, MASS.



MANUFACTURERS OF MACHINE CARD CLOTHING OF EVERY DESCRIPTION.

ESTABLISHED 1760.

PAWTUCKET HAIR CLOTH COMPANY'S HAIR SEATINGS.

QUALITY SUPERIOR TO ANY IMPORTED GOODS.

EVERY PIECE FULLY WARRANTED.

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PAWTUCKET, R.I.

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Manufacturers and Sole Agents for the sale of

Dutcher Temples, Sawyer Spindles, Double Spinning Rings,

WADE BOBBIN HOLDERS,

Thompson Oil-Cans, Shuttle Guides, Slasher Regulators, Slasher Markers, Spooler Guides, Patent Motions for Looms, Patent Steps, Bolsters, &c., &c.

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HOPEDALE MACHINE CO.,

Builders of

PATENT WARPERS, SPOOLERS,

SAWYER SPINDLE TWISTERS, SLASHER BEAMS,

Harper Creels, Copper Rolls, Expansion Reeds and Combs, Yarn Testers, Yarn Reels, Card Stricklers, Centering Machines, Beamers, &c., &c.

HOPEDALE (Milford), MASS.

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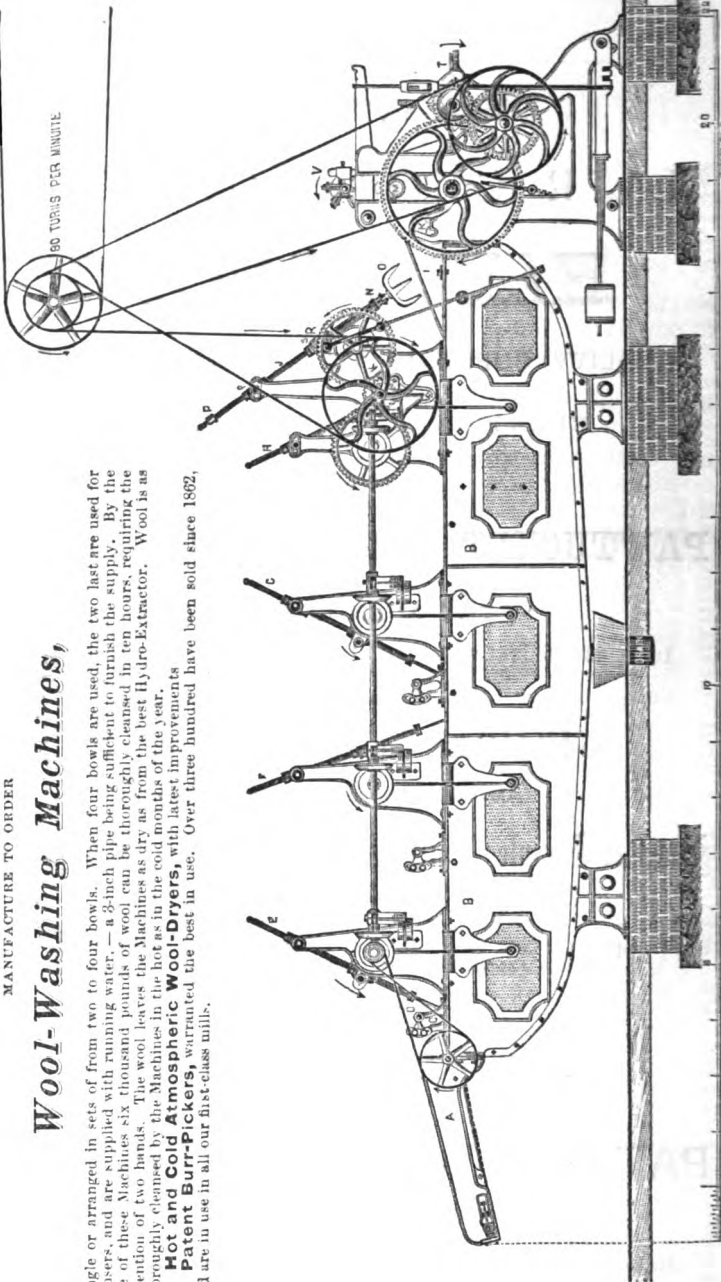
WOOLLEN MILL MACHINERY. CHARLES G. SARGENT & SON, Graniteville, Mass.,

MANUFACTURE TO ORDER

Wool-Washing Machines,

Single or arranged in sets of from two to four bowls. When four bowls are used, the two last are used for rinsers, and are supplied with running water, — a 3-inch pipe being sufficient to furnish the supply. By the use of these Machines six thousand pounds of wool can be thoroughly cleansed in ten hours, requiring the attention of two hands. The wool leaves the Machines as dry as from the best Hydro-Extractor. Wool is as thoroughly cleansed by the Machines in the hot as in the cold months of the year.

Hot and Cold Atmospheric Wool-Driers, with latest improvements
and are in use in all our first-class mills. **Patent Burr-Pickers,** warranted the best in use. Over three hundred have been sold since 1862,



Burring Machines for Cards, with Lumpers attached, which thoroughly opens the wool before it reaches the Cards.

Metallic Feed Rolls and Lickerins for 2d Breakers and Finisher Cards.

Metallic Waste Cards for Yarns and Soft Waste.

Atomizers for Oiling Wool on Breaker Card.

Combing Machines.

Machines for Burring Wool on Felts.

Cotton Openers, &c., &c., &c.

These Machines are in operation in all the principal woollen mills. Numerous testimonials in their favor can be seen at the office of the manufacturers.

 Descriptive Circulars sent free on application.

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HAILE, FROST, & CO., Cashmeretts and Repellents.

FITCHBURG WOOLLEN MILL, Cloths and Cassimeres.

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AND IN BOSTON FOR

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PONTOOSUC WOOLLEN MILL, Repellents, Skirts, Fancy Cassimeres, and Carriage Robes.

JOHN T. WARING & CO.,

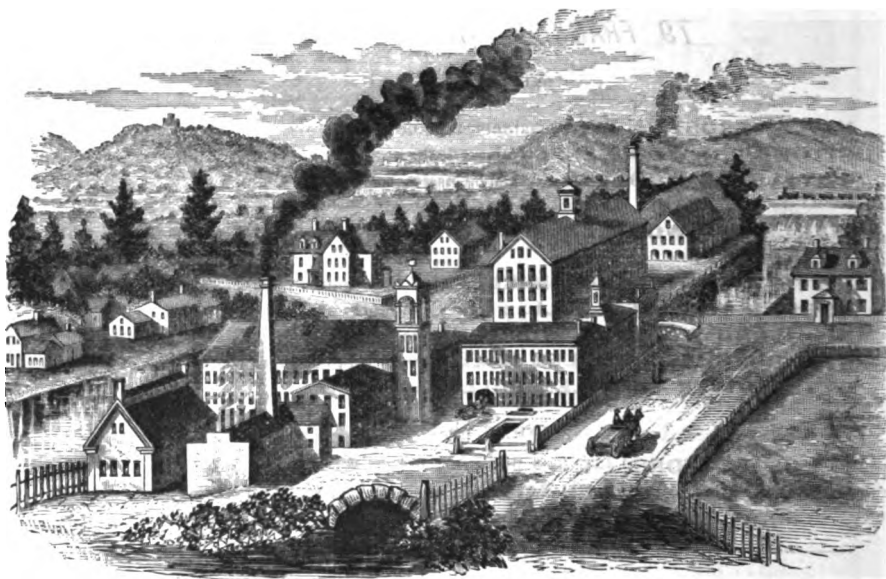
WOOL HAT MANUFACTURERS,

YONKERS, N.Y.

SALESROOMS,

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WORKS OF THE NONOTUCK SILK COMPANY.



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 MANUFACTURERS OF
Machine Twist & Sewing Silk
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TRADE MARKS
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 Corticelli
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 and Clarks
 Pure Dye.

ESTABLISHED 1838.

JUST ISSUED:

UNITED STATES Textile Manufacturers' Directory,

COMPRISING

Woollen, Cotton, Silk, Jute, Flax, Linen, and Paper Establishments,
and Iron and Steel Works in the United States,

For 1875.

This work contains a list of all the above-named manufacturers in this country, description of each Mill, with names of Treasurers, Resident Agents, and Superintendents; kind of Goods manufactured, with extent of Machinery, names of Selling Agents, &c. Arranged in separate departments, as follows:—

Wool and Woollen Department contains a list of WOOL DEALERS in the principal Wool Markets in the United States; WOOLLEN MANUFACTURERS, with capacity of Mill; WOOL CARDERS, SHODDY MANUFACTURERS, &c.

Cotton Department contains a list of COTTON DEALERS in the principal Cotton Markets; COTTON MANUFACTURERS, with capacity of Mill; THREAD, LINE, AND TWINE MANUFACTURERS and PRINT WORKS.

Silk Department, comprising list of DEALERS IN RAW SILK, IMPORTERS, &c.; SILK MANUFACTURERS, with description of Goods made, Agencies, &c. Prepared by the Secretary of the Silk Association of America, specially for this work.

Jute, Flax, and Linen Department. Devoted to these industries.

Dry Goods Department. List of Dry-Goods Commission Houses, Offices, and Agencies of Manufacturing Companies in the principal Cities.

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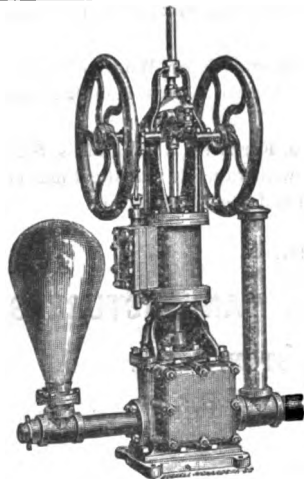
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